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February 1988

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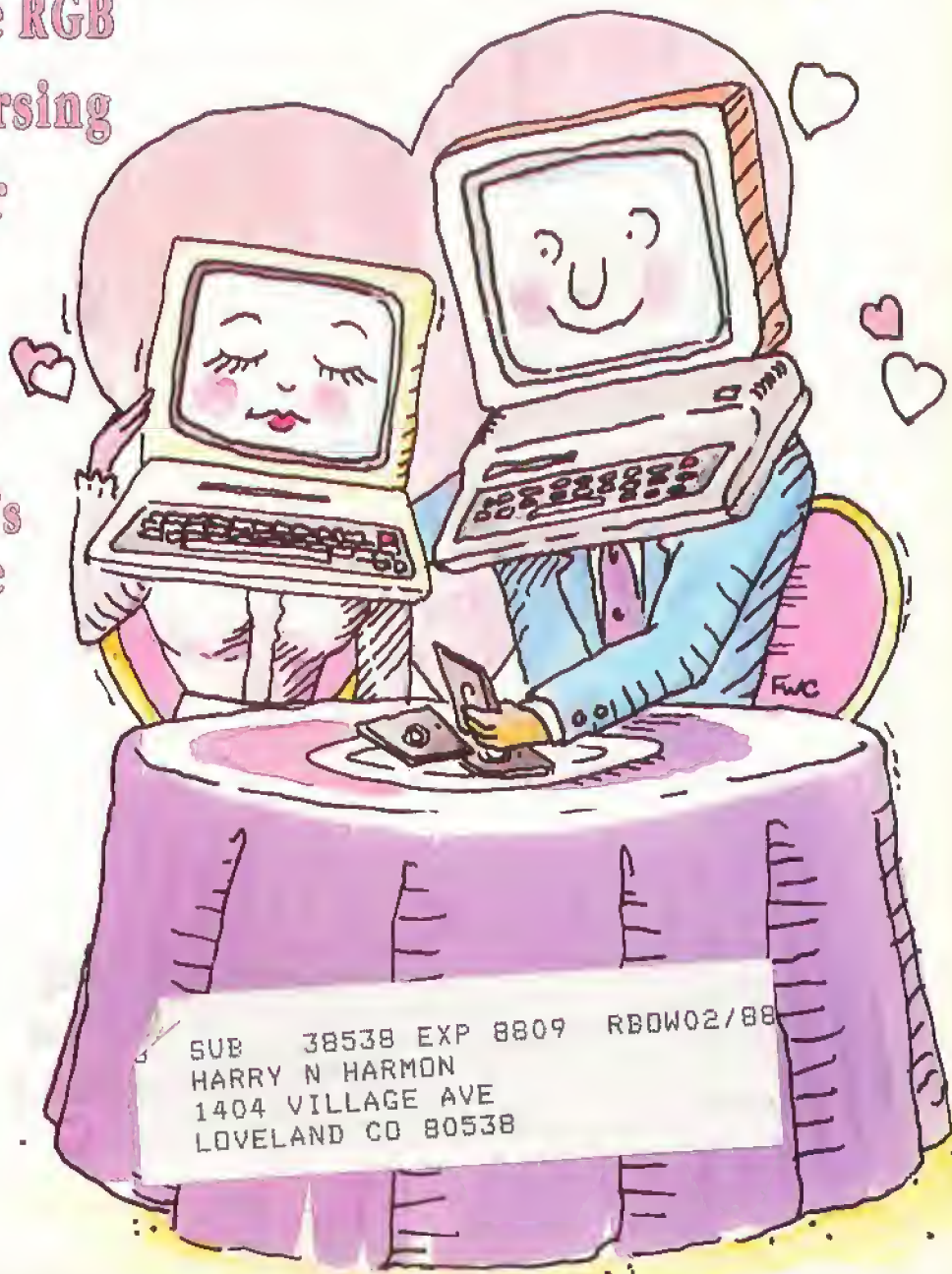
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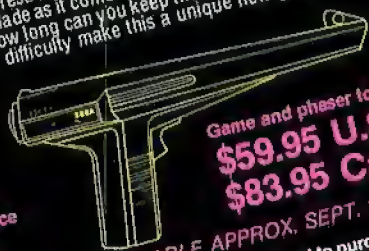
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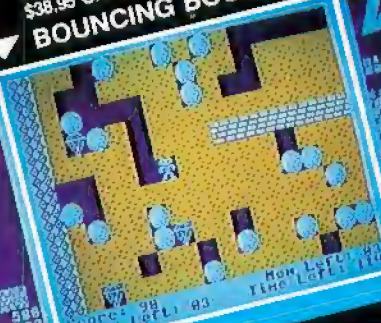
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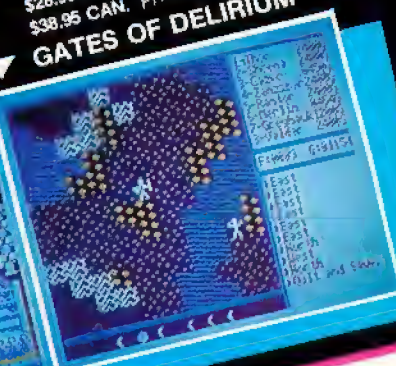


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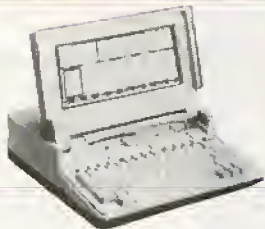
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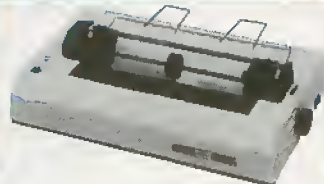
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OS-9 Happenings

Editor:

I have had OS-9 Level II for eight months and got nowhere with it until I bought Dale and Peter's latest opus — then it happened!

It is as if someone turned on a switch in my head! Having bought the book a week ago, I am now going back to the original manual and actually understanding it!

I cannot stress the importance of Level II on the CoCo 3 highly enough. I have seen a Hi-Res game and a complex database running concurrently on my \$200 box — I can really see what all the excitement is about. Although my experience with computers stretches back to the early days of minicomputers, I have always been a bit of a computer oaf — strictly an "I don't care how it does it" type of person. So, if I can figure Level II out, anyone can.

My brother is a long-time CoCoist (got me interested), but lately he's been thinking about buying MS-DOS. But on my recommendation, he now wants to see some of the new applications under Level II.

A friend of mine bought *Data Master* from Computerware. I got to play with it briefly. At first glance, the program is a great example of the raw speed and power available using Level II and the windowing environment. One thing I loved was the manual — if they can cram everything you need to read into 43 pages, including six pages of index and introduction, it has to be the most user-friendly system I've ever seen. (I am currently saving up the \$70 to buy it myself, but have already spent my December computer allowance!)

Ivan Scanlow-Carling
Antioch, TN

The Year's Best

Editor:

Approximately one year ago, I unpacked my CoCo 3 and went into business. Since then, I have subscribed to RAINBOW and RAINBOW ON DISK and have had one solid year of enjoyment. I would like to start the "Program of the Year" contest by selecting my three favorites from 1987.

3rd Runner Up — *DU-3* by Mike Jorgenson, February '87. This program has been transferred to every one of my disks and is a super utility, better than any I could have purchased for \$50 and up. Thanks, Mike, for helping us novices.

2nd Runner Up — *Write III* by Bill Cook, April '87. I am writing this letter right now on this word processor galore. Don't have to buy one now, Bill. You could have marketed this baby, but you chose to share it with your fellow CoCoholics! What a guy!

Program of the Year — *City Sun* by Greg Hall, November '87. If there's one thing I

can't stand, it's a 13-year-old kid who can write better programs than I can! All joking aside, I still can't believe what this program does. Congratulations, Greg! You have a tremendous future ahead of you, and thanks go to your parents for encouraging your talents.

Bernice M. Shoobs
Clifton, NJ

Positive Reaction?

Editor:

Although I am totally against software piracy, whether it be for profit, trading, or just giving, I have my own views on how the problem might best be handled.

Of the many programs I have purchased, most are in some way copy-protected. However, three of them (including the one I am using to write this letter) are not only unprotected, but come with manuals that encourage the user to make a backup copy and save the original. Cognitec (*Telewriter-64*), Sierra On-Line (*Winnie the Pooh in the Hundred Acre Wood*) and Island Graphics (*Micro Illustrator*) are all to be commended. They obviously trust their customers enough to make it easy for them to ensure the longevity of their purchase. You've got to feel good about dealing with people like this.

I am certain that there are some people who take advantage of these companies, but they would probably steal from the Salvation Army. I couldn't violate this trust and still sleep at night, and I think the vast majority of home computer users feel the same way. Many people in the software business would think I'm naive, but this is not guesswork on my part. It is a considered opinion based on experience.

I work in the car business. Our dealership is rather unique in one surprising respect. We maintain an inventory of some 300 cars and trucks, and they all are kept unlocked with keys in the ignitions all day long. And they are never locked! All night long, and on Sundays (when we are closed) customers can get in the cars, lift the hoods and inspect them all they want. The keys are removed, but no other form of protection is used. Foolish? I don't think so. We experience no more vandalism and theft than any other dealership I have worked in.

Now granted, Maine is not exactly the crime hotbed of the nation. Nevertheless, people are people and we are all subject to temptation. But a surprising number of us react positively when shown that we are trusted.

My message is simple. Assume a little integrity in your customers and let them know it. You just may find it to be the best form of copy protection yet.

Incidentally, RAINBOW's product reviews motivated me to buy all three of these excellent programs, along with several other

pieces of software and hardware. Even if there were nothing else of any consequence in your superb magazine, these unbiased, informative reports would in themselves be more than worth the price of the subscription. You haven't steered me wrong yet.

Paul Fullerton
Gardiner, ME

REVIEWING REVIEWS

Editor:

I would like to correct Mr. Augsburg's statement in the October issue in which he reviews *Color Max 3*. He states that the printer support includes "even a version that produces 16-color printouts of the screen on a CGP-220." This is untrue. The CGP-220 Ink Jet Printer has the information contained in its ROM to print a total of seven colors, six of which are produced by the subtractive coloring system, as the manual states. Any two of the colors (yellow, magenta and cyan) can be paired to produce three more colors: red, green and violet. Black, though technically not a color (the absence of all color being black) reflects some light, so in practice qualifies as color Number 7.

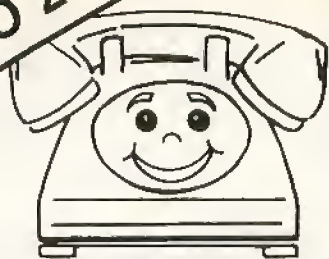
The *Color Max 3* software uses a technique called dithering, where colors are "meshed" together but not mixed in order to produce a simulation of a desired color on the CGP-220, not an actual color for color representation. This I was told by a representative of Computize.

I would like to add that I have seen actual CGP-220 color prints made with *Color Max 3* and was very impressed. But will there ever come a time when the CGP-220 is permitted to "grow up," as it were, to fully implement the abilities of this machine? This printer could, with the correct software/hardware, faithfully reproduce any of the 64 colors the CoCo 3 can show on its screen. When will it be realized that this printer can be the perfect mate to the CoCo 3? After all, it is a "color" computer, so don't you think it would be logical to have at its side a "color" printer?

If this issue were left up to Tandy, I would have no hope. But what I do have is pride in a strong CoCo Community that is ready to support its third-party developers. Tandy no longer markets this fine printer even though Canon USA, Inc., still manufactures it as the PJ-1080A Ink Jet Printer. Come on, all you programmers and developers, how about a real challenge . . . or maybe we should just be content and not worry about such a trivial thing as color, and we'll all "upgrade" to a black-and-white CoCo to match our black-and-white printers!

Charles R. Womble
Wilmington, NC

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HINTS AND TIPS

Editor:

To make my *Genealogy* programs [September and October '87 issues] work with a DMP-130 printer, these lines must be modified in the PAGE program: 380, 400, 440, 460, 490, 530, 550, 580, 660, 740, 770, 850, 870, 900 and 980.

These lines must be modified in the FAMILY program: 3780, 3800, 3840, 3860, 3890, 3930, 3950, 3980, 4020, 4040, 4070, 4110, 4130, 4160 and 4200.

The lines will have to be changed from PRINT # - 2, CHR\$(27); CHR\$(90); CHR\$(12) to PRINT # - 2, CHR\$(27); CHR\$(64); CHR\$(24).

No lines have to be modified in CHART, as the PRINT commands do not appear.

*Brian Le Blanc
Digby County, Nova Scotia*

(\$10.00) is for newer CoCos (U14 through U21 are not "the same size.") Older CoCos use the part No. TRS-64K-2 (\$8.95). U14 through U21 are "the same size" to use this one.

My machine had eight 8040517 RAM ICs, so I needed the TRS-64K-2 kit. I removed the eight RAMs, put in the ones from Jameco and soldered the W1 jumper into place (it's marked "64K" on the board!), and nothing could be easier. Do use static precautions: Don't stand on a rug while handling the computer or ICs. Ground yourself on the kitchen faucet before touching anything. Don't bend the pins. Touch the tip of the soldering iron to ground before touching the board. Don't touch any ICs unnecessarily. Use a small screwdriver to very gently pry an IC out of its socket.

*James English
Kansas City, KS*

This modification will adapt the 1987 graphics display to 1988.

*Shawn Robb
Amarillo, TX*

INFORMATION PLEASE

Editor:

I am looking for people willing to exchange software they have written concerning quality control or assurance, and statistics.

I have written several programs in BASIC and have started to convert them to run under BASIC09, using many of the enhancements available to me on the CoCo 3 and OS-9 Level II.

I am hoping to hear from interested readers, especially from those who are members of the American Society for Quality Control.

*Charles Blair
5820 Balmoral St.
Brossard, Quebec
Canada J4Z 2H4*

Inexpensive Upgrades

Editor:

I recently read a letter concerning the expense of upgrading a 16K or 32K CoCo 2 to 64K. I became aware that many of your readers are paying large amounts of money to make the upgrade. There is a much cheaper way.

Jameco Electronics, 1355 Shoreway Road, Belmont, CA 94002 (415-592-8097), offers two kits for making the conversion easily and cheaply. Part No. TRS CoCo

A New Year

Editor:

Here is a change to the program *New Year* by Carmie A. Thomas [January '87, Page 29]:

```
60 DRAW"BM24,20;55L2R2D20L4R8B
R10U20L5D5R5B10U5D20R5U11LSU
10R5D10BR7U10D20R5U11LSU10R5D
10
```

CoCo Carrier

Editor:

I deliver papers and am very interested in being able to put my route on my computer. I have to bill my customers once a month, so I need a way to do this. Also, I need to keep track of names and addresses because I need to run this off, and I would like to keep track of the payments as they come in.

We also have a list of customers who pay directly to the office and their expiration dates: Does anyone know of a program to help me?

*Sindy Shields
Rt. 6 Box 362
Rocky Mt., VA 24151*

KUDOS

Editor:

I have wanted to brush up on statistics for some time, but could not find the right book. At the RAINBOWfest in Princeton, I picked up a copy of *The Rainbow Introductory Guide to Statistics* and the disk that goes with it. Let me say that brushing up has been easy, as the book is well-written, and the program is very good.

Thanks for a job well done.

*Douglas F. Woolley, Jr.
GIMLET
Convent Station, NJ*

Brush With Celebrities

Editor:

On the few occasions I have gone online with Delphi, I've managed to "bump" into a few of the more notable CoCo users.

While in conference, I have found that these individuals are quite tolerant, courteous and helpful to newcomers — even when the first-time user jumps into the middle of their conversation.

Jim Reed, Don Hutchison, Rick Adams and a host of other contributors deserve all the support and acclaim the CoCo Community can give them.

*Charles A. Grossman
CAG
Farmington, NM*

PEN PALS

• I am 15 years old and would like a pen pal. I have a CoCo 2, disk drive, CGP-220 Color Ink Jet Printer and joystick.

*Kevin Cain
12506 NE 142LN #C203
Kirkland, WA 98034*

• Lakeland Communications, International Student Penfriends is the largest student pen pal organization in the world for all students who are 7 to 18 years of age. We have thousands of members who like computers, sports and many other interests! We have monthly pen pal book listings, newsletters and monthly contests. All students 7 to 18 years of age who would like to join may write to us and we will send complete details! Please send a #10 business size SASE to: Lakeland Communications, International Student Penfriends, 7430 Antebellum Blvd., Fort Worth, Indiana 46815.

• I am a 15-year-old looking for a pen pal. I own a 64K CoCo 2, with a cassette recorder.

*Sherree Connelly
79 Edna Ave.
Mechanicville, NY 12118*

• I am 16 years old and looking for pen pals from anywhere. I have a 64K CoCo 2 with two joysticks, disk drive (RS-DOS), DMP-105 printer and a DMC-3 modem. I have solved *Black Beard's Island*, as well as *Dragon Blade* and a few others. I am most interested in high action arcade games.

*Jesse Sanders
P.O. Box 84
Chimney Rock, CO 81127*

• I am 14 years old and have a CoCo 3 and two drives, which I use mostly for graphics. I enjoy listening to music, especially Whitesnake and Led Zeppelin. I would like to hear from girls over 14 or guys with the same interests, from anywhere. Will answer all letters.

*Greg LeMar
315 Smirner Blvd.
Phillipsburg, NJ 08865*

• I am 14 years old and have a CoCo 2 and 3, DMP-105 printer, disk drive, cassette recorder and Speech/Sound Pak. I am mostly interested in Adventures and games. Anyone from anywhere can write.

*Marianne Torracco
804 Eagle Street
Utica, NY 13501*

• I am 13 years old and have a 64K ECB CoCo 2, disk drive, and a DMP-130 printer. If you want a pen pal, please write me. I'll answer all letters!

*Chris Casson
3 Channing Lane
Camillus, NY 13031*

• I am 21 years old and I am looking for pen pals who run Color Computer bulletin board systems. I have a CoCo 2, modem, printer, cassette and a disk drive.

*John Peavy
1617 Savage Rd. NE
Salem, OR 97301*

• I'm interested in writing to and hearing from CoCo addicts from all over the world. I have about 20 pen pals I write to on a continual basis, and I'm always looking for more. I have a CoCo 2, CoCo 3 (just got it!), DMP-130 printer, DCM-5 modem, two disk drives and lots more. All letters will be answered, so please write.

*Erick Molnar
P.O. Box 4616
Sparks, NV 89432*

• I am a 17-year-old male looking for a pen pal. I have a CoCo 2, a single-sided and a double-sided disk drive, Multi-Pak, tape drive and a DMP-130A printer. Everyone who reads this qualifies. If we don't talk CoCo then we can just talk. I especially enjoy Adventure games. I guarantee all letters will be answered.

*Matt Fumich
P.O. Box 1346
Murford, TN 38058*

BULLETIN BOARD SYSTEMS

• Call the Grand Rapids BBS Wyoming Pubb, 616-538-8229. The BBS operates under the OS-9 and UNIX operating systems on a CoCo 2 with 512K RAM.

*Robert M. Worth, Jr.
1726 Millbank S.E.
Grand Rapids, MI 49508*

• Call the best CoCo Board in Reading, Pennsylvania, the Glass Menagerie. We have a System 2 for strictly CoCo downloads and four drives full of programs. Try the best online game section ever! Call 215-376-1819 24 hours, seven days a week. 8/N/1, 300/1200 baud. Run on two CoCo 2s, 10 disk drives! SysOp: Glassy. Co-SysOp: Lewis Brubaker.

*Allen H. Cravener
1137 Cotton St.
Reading, PA 19602*

• The Dungeon BBS of Newport, North Carolina, is now online running on *Colo-rama* Version 4.0, featuring games, Hi-Res graphics, multiple message bases, uploads and downloads. Hours of operation: 6 p.m. to 6 a.m. Monday through Friday, 24 hours Saturdays and Sundays. 300 baud, protocol of 8-N-1. Supports all CoCos. Call 919-726-9737.

*Chuck Katsikes
410 Scott Drive
Newport, NC 28570*

• I would like to inform your readers of two new BBSs that run under new software called CSBBS. The programs were written especially for the CoCo 3! Both have screen width settings and multiple message bases, provide support for the whole family of CoCos, and have helpful SysOps. Both have four drives online and operate 24 hours a day at 300/1200 baud, 7/E/1:

Fox Communications 602-846-2002
Dream Weaver 602-848-9902

*Charles Pippin
6827 W. Luke
Glendale, AZ 85303*

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type RAI to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type LET to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

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Auto-repeat; Key-Click; Cursor up, down, left, right, beginning of line, end of line, next word, previous word, top of text, end of text; page forward, backward; 4-way scrolling; block copy, move, delete;

global search and replace (with wild-card search); line positioning (left, right or center); insert/overstrike modes; delete to beginning/end of line, next/previous word; and tabs. You can also embed printer codes in text to take advantage of underlining, sub/superscript and other printer functions. Define left, right, top and bottom margins, and page length.

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RAINBOW

Info

How To Read Rainbow

Please note that all the BASIC program listings in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service. An order form for these services is on the insert card bound in the magazine.

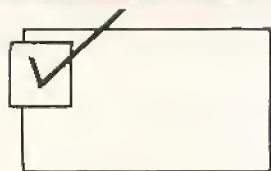
What's A CoCo?

CoCo is an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

However, when we use the term CoCo, we refer to both the Tandy Color Computer and the TDP System-100 Computer. (While many TDP-100s are still in service, the TDP Electronics division of Tandy no longer markets the CoCo look-alike.) It is easier than using both of the "given" names throughout THE RAINBOW.

In most cases, when a specific computer is mentioned, the application is for that specific computer. However, since the TDP System-100 and Tandy Color are, for all purposes, the same computer in a different case, these terms are almost always interchangeable.

Rainbow Check Plus



The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program

and save it for later use, then type in the command RUN and press ENTER. Once the program has run, type NEW and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK(35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y:W
60 POKE Z,Y:NEXT
70 IF W=7985 THEN B0 ELSE PRINT
  "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: CMDS and SOURCE. It also contains a file, *read.me.first*, which explains the division of the two directories. The CMDS directory contains executable programs and the SOURCE directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the SOURCE directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from

RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

- 1) Type `load dir list copy` and press ENTER.
- 2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the system master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
- 3) List the *read.me.first* file to the screen by typing `list read.me.first` and pressing ENTER.
- 4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the CMDS directory, enter `dir cmds`. Follow a similar method to see what source files are in the SOURCE directory.
- 5) When you find a program you want to use, copy it to the CMDS directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/ filename /d0/cmds/ filename -s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/ filename /d0/cmds/ filename`

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which sometimes causes problems with ORIGIN or EQUATE statements. You ought to know something about assembly to try this.

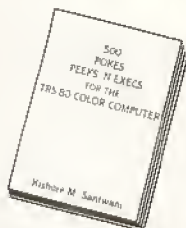
Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F00
20 PRINT "ADDRESS: ";HEX$(I);
30 INPUT "BYTE":B$
40 POKE I,VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the &H3F00 in Line 10 to &H7F00 and change the value of I to &H7F00.

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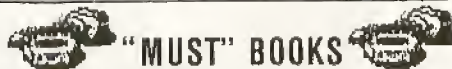
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Some Random Thoughts . . .

You, as a member of the CoCo Community, are far luckier than I am. As I write this, the sun is positioned exactly over the Tropic of Capricorn, which means that (except for our friends in the Southern Hemisphere) it is the first day of winter and the shortest day of the year. Consider that when you actually read this it will be six weeks hence and the groundhog will be about to pop out of his burrow in Pennsylvania and, hopefully, forecast an end to winter.

It certainly is something to think about. Maybe that's why I am always behind the times.

Tandy's new flight simulator for the CoCo 3 is one of the all-time best. It is adapted from Microsoft's *Flight Simulator*, which has been in release in the MS-DOS market for some time.

As many of you know, I have a private pilot's license and fly a Cessna 172. The program is based on a Cessna 182, which is a little more powerful than my plane — but the feeling of flying is about the same.

For just about anyone who is learning to fly — or is just thinking about it — this flight simulator has all the goodies, including VOR receivers so you can practice instrument flying and approach techniques. It “behaves” like a real airplane in the air and is a great deal of fun to fly.

If you're looking for a shoot-'em-up in the air, forget it. But if you want, instead, to brush up on some techniques, this program is a safe, inexpensive and very realistic way to do all that and more.

It is probably as good a time as any to introduce you to Steven and Cheryl Walbutton of Broadmeadow, Australia.

As a number of you are aware, one of the first “overseas” locations in which the CoCo and THE RAINBOW thrived was the land “down under.” A fine chap by the name of Greg Wilson called me one evening and asked to be able to reprint most of the “Yank” version of the magazine with some special “Aussie”

COCO 3 UTILITIES GALORE

(All utilities support 40/80 columns for CoCo 3)
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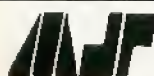
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"For just about anyone who is learning to fly — or is just thinking about it — this flight simulator has all the goodies."

news as well under a royalty agreement. I told him to go ahead and a friendship was born.

Greg met an untimely end several years ago and others became involved with the Aussie edition. Then, just a few months ago, we reached an agreement with the Walbuttons to continue on in the same sort of tradition that Greg started. We've been quite pleased here and, from the way things are going "down there," it seems that much more than the kangaroos, koala bears and wombats are interested, too. We're glad that we are now able to provide a quality Australian version of THE RAINBOW again.

As a matter of fact, Steven and Cheryl have gone far beyond the call of duty. I'm fascinated with folk songs of other lands, and find the folk songs in Australia perfectly delightful. I even have a favorite singer, Slim Dusty, who has done some absolutely incredible songs that — at least to my mind — capture the feel and heartbeat of Australia.

I became "acquainted" with Dusty through a tape that included two terrific songs, "The Man From Snowy River"

and "The Ballad of Henry Lawson." I asked the Walbuttons if there were any Slim Dusty tapes and have been happily playing them ever since. Seems I'm not the only one who likes him: He is supposed to be one of the top folk/country singers in Australia.

Dusty really captures the spirit of the land of which he sings through his lyrics. Here in the United States it is, of course, late December as I write this and, so, perhaps, it is fitting to quote a short passage from "The Man From Snowy River" in which Dusty sings of a place . . .

*Where the air is clear as crystal
And the white stars fairly blaze
At midnight in the cold and frosty skies*

I can just see Santa headed for my chimney through a night like that — an occurrence that is due the end of this week (provided that I've been good).

I hope 1988 will be good for all of you.

— Lonnie Falk

Corrections

"RAMDisk — Speedy File Handling" (Review, January 1988, Page 138): The *RAMDisk* review incorrectly stated that the product is available from Spectrum Projects. This product is available from Cer-Comp, 5566 Ricochet Avenue, Las Vegas, NV 89110, (702) 452-0632, for \$19.95.

"The BASIC Versions" (Doctor ASCII, January 1988, Page 155): In his answer to Josh Abrams' question regarding the use of *EDTASM* on the CoCo 3, Richard Esposito presented a program, *Patch*,

which was written by Roger A. Krupski. The last line of *Patch* was inadvertently left out of the listing. Just add the following line and *Patch* should work properly:

610 DATA "END", "END"

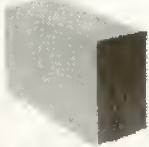
"Making an Address List" (December 1987, Page 66): George F. Saunderson has written to indicate his phone number was incorrectly listed at the end of the article. The correct phone number is (713) 781-8984.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

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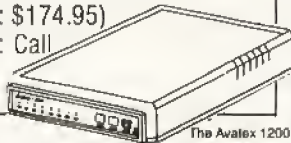


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The Ultimate Utility

If you are one of the thousands who've just received a new Color Computer for Christmas, congratulations, and welcome to THE RAINBOW. Our magazine is devoted to helping you learn all you can about how to get the most from your CoCo (short for Color Computer). If you missed our January beginners issue, don't worry, because every issue of RAINBOW has lots of material for beginners. In fact, in one aspect or another of the CoCo's many uses, all of us are beginners. And few of us will ever forget that thrill of discovery and feeling of control we experienced when we first powered up our CoCo and played with those short sample programs in the manual.

Today's Color Computer is a very powerful machine despite its very modest price. The fact is, thousands of us, when we bought our first Color Computer, paid four or five times as much for a machine that had only 4K of memory. Now the standard is a 128K machine that can easily be upgraded to as much as 512K. There's a lot of computer in that little white box.

In many ways, we'd love to be right there with you as you get to know your CoCo. Do you have your new machine hooked to the TV in the living room? That's how most of us started. But we soon found out that CoCoing there was not very convenient, so we took over the "spare" TV in the bedroom only to find out it really couldn't be spared after all. So, we purchased a TV or monitor just for the CoCo.

Are you using a non-Radio Shack cassette recorder? If so, you'll discover that while your old tape recorder will probably work, it won't work as well as the computer cassette recorder. Whatever the brand or model, do turn up the volume! We find that is one of the most common problems encountered by new users — yep, they just forgot to turn up the volume (set it on 3) so that the computer could "hear" the incoming data.

Have you bought a multi-plug "power strip" yet? Might as well get two to start with; you'll need the other one soon enough as you begin to develop your "computer corner," if not an entire room. Is your printer cable too short? You'll find a wide variety of cables, extensions and switch boxes of all types in the pages of RAINBOW. In fact, since the CoCo is now in its ninth calendar year, just about everything you discover you need will be readily available when you want it. Many of our advertisers have built their companies on anticipating the needs of CoCo users and then developing products to answer those needs. You'll learn a lot just by reading the ads!

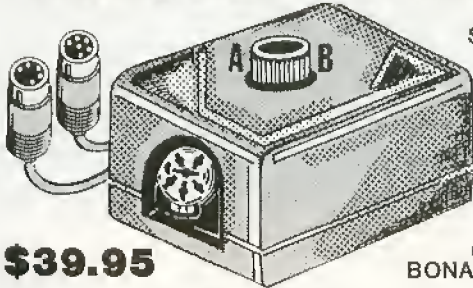
One of the needs that is never fully satisfied is the need for utilities, the focus of this month's issue. A utility is a program or routine that is used as a tool in computing. It seldom has an end use in itself, but is used to help make other programs easier to use, faster executing and more efficient. As you "get into" computing, you'll discover why utilities are so popular.

For now, though, we want to welcome you to one of the most important "utilities" any Color Computer user can have: THE RAINBOW. Now that you've discovered THE RAINBOW, do consider a subscription to keep the information coming all year long. Together, we'll explore to the fullest the potential of our Color Computer.

— Jutta Kapfhammer

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CoCo Gallery



Mysterious Island

Keith Schuler

Keith used *CoCo Canvas*, a program he wrote, to design this inscrutable depiction. He lives in Merritt Island, Florida.

Honorable Mention



Destroy

James Farmer

James, of N. Charleston, South Carolina, used *Color Max 3* to display this view of planetary combat.



Ship At Sea

Brad Bansner

This image of a ship sailing into the sunset was originated with *Color Max 3*. Brad lives in Wyomissing, Pennsylvania.



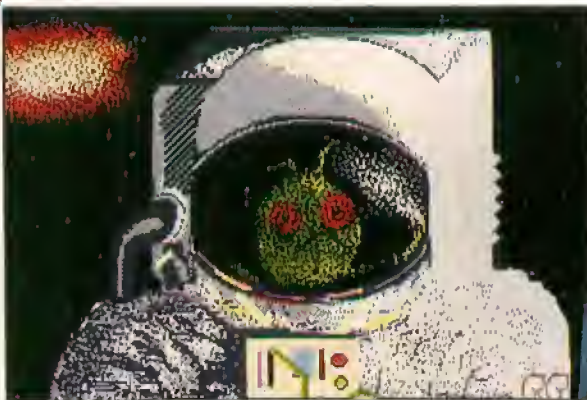
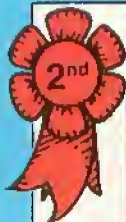
Dragon

Stu Scott



We are taking "CoCo Gallery"
to RAINBOWfest Chicago!
See Page 35 for details.

Stu, of Sandyhook, Connecticut, used BASIC to develop this animated scene. His hobbies include drawing, playing Adventure games and Shotokan karate.



Space Man

Richard Perreault

This unexpected, horrendous-looking character was brought into being through *Color Max 3*. Richard lives in Boucherville, Quebec, and works for a telecommunications firm.

SHOWCASE YOUR BEST! You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community! Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is *not* an original work.

We will award two first prizes of \$25, one for the CoCo 3 and one for the CoCo 1 and 2; one second prize of \$15 and one third prize of \$10. Honorable Mentions may also be given.

Please send your entry on either tape or disk to the CoCo Gallery, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. Remember, this is a contest and your entry will not be returned.

— Angela Kapthammer, Curator



BASIC for Beginners

Lesson III

By David W. Ostler

So far in this series we have talked about commands that allow you to do some fairly impressive programming. But by no means can we cover all the commands utilized by the Color Computer BASIC language in only four installments.

We have already covered many common BASIC commands, giving you a solid base of programming skills to expand upon. You will eventually need to know how to make a program accessible to disk and tape input/output, so that you can save your results, but we'll cover disk and tape input/output in detail next month.

This month we will cover the commands necessary to determine whether a disk drive or cassette recorder is present. We will also discuss variable memory allocation and how to do logical comparisons of variables. In addition to a few new commands, we are presenting some variations on commands described in previous installments.

DIM

The DIM command sets up memory for use by predefined variable *arrays*.

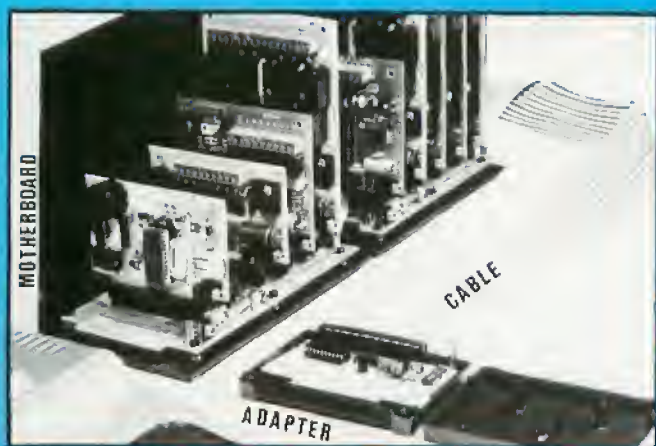
An array is a group of variables with attached labels that relate them to a particular label. An example is an array that has 10 parts, all labeled M. The variables have these assignments: M(1), M(2), M(3), M(4), M(5), M(6), M(7), M(8), M(9), M(10).

Please note that each variable is unique and can be manipulated independently of the others. To display or manipulate the variable, you must access its label and assignment. The proper syntax for the command that lets you enter a new amount in a variable is DIMx(yyy), where x is the variable

Dave Ostler is an IC layout designer and the systems manager for a CAD main-frame system. He teaches CAD and electronics at Guilford Technical Community College. Dave is married and has three children, Avis, Chuck and Erik.

The Amazing A-BUS

NEW



An A-BUS system with two Motherboards
A-BUS adapter in foreground

The A-BUS system works with the original CoCo,
the CoCo2 and the CoCo 3.

About the A-BUS system:

- All the A-BUS cards are very easy to use with any language that can read or write to a Port or Memory. In BASIC, use INP and OUT (or PEEK and POKE with Apples and Tandy Color Computers)
- They are all compatible with each other. You can mix and match up to 25 cards to fit your application. Card addresses are easily set with jumpers
- A-BUS cards are shipped with power supplies (except PD-123) and detailed manuals (including schematics and programming examples).

Relay Card

RE-140: \$129

Includes eight industrial relays, (3 amp contacts, SPST) individually controlled and latched. 8 LED's show status. Easy to use (OUT or POKE in BASIC). Card address is jumper selectable.

Reed Relay Card

RE-156: \$99

Same features as above, but uses 8 Reed Relays to switch low level signals (20mA max). Use as a channel selector, solid state relay driver, etc.

Analog Input Card

AD-142: \$129

Eight analog inputs. 0 to +5V range can be expanded to 100V by adding a resistor. 6 bit resolution (20mV). Conversion time 120us. Perfect to measure voltage, temperature, light levels, pressure, etc. Very easy to use.

12 Bit A/D Converter

AN-146: \$139

This analog to digital converter is accurate to .025%. Input range is -4V to +4V. Resolution: 1 millivolt. The on board amplifier boosts signals up to 50 times to read microvolts. Conversion time is 130ms. Ideal for thermocouple strain gauge, etc. 1 channel. (Expand to 8 channels using the RE-156 card)

Digital Input Card

IN-141: \$59

The eight inputs are optically isolated, so it's safe and easy to connect any "on/off" devices, such as switches, thermostats, alarm loops, etc. to your computer. To read the eight inputs, simply use BASIC INP (or PEEK).

24 Line TTL I/O

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Connect 24 input or output signals (switches or any TTL device) to your computer. The card can be set for input, latched output, strobed output, strobed input, and/or bidirectional strobed I/O. Uses the 8255A chip

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3 1/2 by 4 1/2 in. with power and ground bus. Fits up to 10 IC's



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ST-143



RE-140



IN-141



AD-142

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Special Package: 2 motors (MO-103) + ST-143: PA-181: \$99

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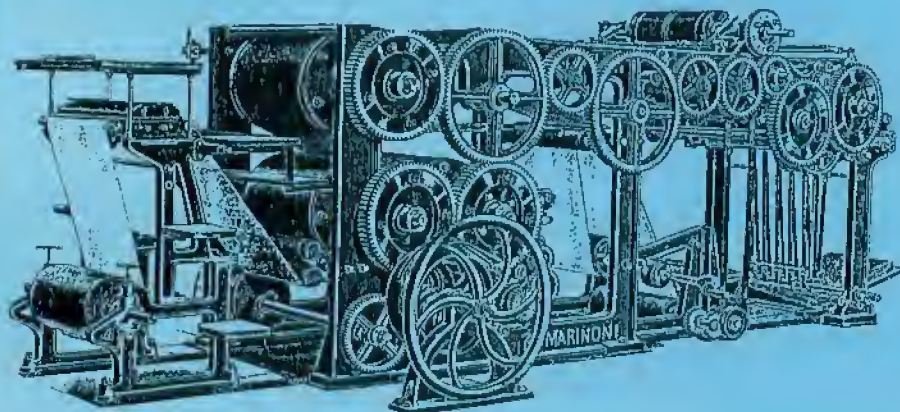
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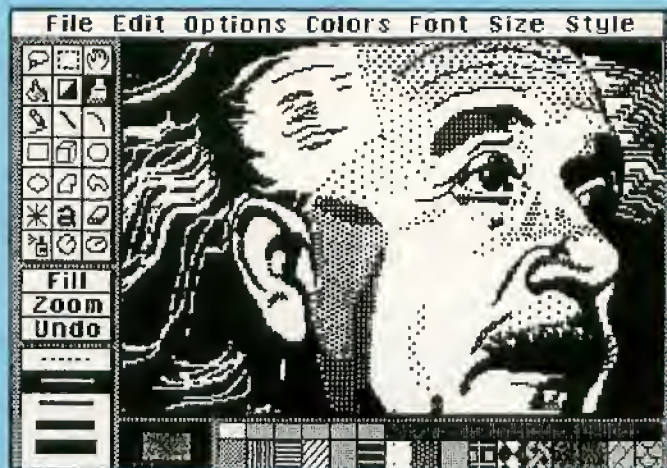
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the array sets up (also called the label) and *yyy* is the number of variables in the group to be defined. The DIM command must always take place early in the program, *before* use of the CLEAR command.

PEEK

The PEEK command allows you to look at memory locations and determine various function values in the computer such as printer baud rate, disk or tape I/O, whether LIST and LLIST are disabled, etc.

The proper syntax for this command is PEEK (*xxx*), where *xxx* is the location to be examined or "peeked." Also, the value returned can be viewed only when used in conjunction with a variable, as in these lines:

```
10 A = PEEK(xxx)
20 PRINT A
```

Logical Comparisons

A valuable function of the BASIC language, for the Color Computer as

well as other computers, is the ability to compare variables in a logical manner. *Logical comparison* determines whether variables are generated by program manipulation or entered by an external source by comparing the results of two variables. The logical comparison operators are AND, NOT, OR. Here is an example of logical comparison:

```
10 IF (A = X AND B = Y) THEN
  GOSUB 1000
```

This line is basically an IF/THEN command, but with something extra — the logical comparison operator AND. The command line reads: If A equals X *and* B equals Y, then jump to the subroutine at Line 1000. Try this one:

```
10 IF NOT (A = X AND B = Y) THEN
  GOSUB 1000
```

This line is also basically an IF/THEN command, but uses the logical comparison operator NOT. This command line reads: If A does *not* equal X *and* B does

not equal Y, then jump to the subroutine at Line 1000. Try another:

```
10 IF (A = X OR B = Y) THEN GOSUB
  1000
```

Again, the line is basically an IF/THEN command, but it includes the logical comparison operator OR. The command line reads: If A equals X *or* B equals Y, then jump to the subroutine at Line 1000.

These examples cover some of the ways to use the logical operators. The commands can be combined to obtain very elaborate logical comparisons of variables and are invaluable in programming.

LINEINPUT

The LINEINPUT command is exactly like the INPUT command covered in Lesson 1 (September 1987, Page 27), but with one exception: Where the INPUT command restricted the entry of variables to characters without punctuation, the LINEINPUT command al-

Line	Description	Line	Description
0	a remarked line.		errors found in the variables entered in lines 140 to 170.
10	clears 1,000 bytes for variable storage, sets T equal to 100, sets N equal to 0, and dimensions variables B\$, C\$, D\$ and E\$ to the size of 10 variables each.	200	adds one count to the variable label N and checks the value of N — if N is equal to 10, it forces the program to Line 6000.
20	a remarked line.	210	clears the screen and prints the text at the desired locations.
30	sets A equal to the value peeked at location 188.	220	sets I\$ to an INKEY\$ function and tests the keyboard for the conditions found in this line.
40	a remarked line.	300-330	the error correction lines for the INKEY\$ function called in lines 180 to 190. After the corrections are made, the line forces a jump to Line 140.
50	sets B equal to the value peeked at location 116.	900	sets up a FOR/NEXT value for B. Note: When displaying variables entered in arrays, you must use the variable label used in incrementing the array (at this time we are using N, as a label), minus 1 to count down the variable. Remember, the computer always counts — in this case, from 0 to 10.
60-80	test the values of A and B and steer the program to the proper location after these tests.	910-940	display the text with its associated variables that are related to the variable array label value, B.
85	forces a jump to Line 2000.	950	prints the text at the location.
95	a remarked line.	960	sets I\$ to an INKEY\$ function and, if any key is pressed, will continue on with the program.
100	clears the screen, prints text and the value of N, prints a blank line, and allows the entry of variable B\$ as related to the dimensioned variable label, N.	1000-2010	subroutines called by previous lines. The subroutine starting at Line 1000 identifies the type of computer system that the program has detected. The subroutine starting at Line 2000 is the menu for the data entry of the program.
110	prints a blank line and allows the entry of variable C\$ as related to the dimensioned variable label, N.	5000	terminates the program.
120	prints a blank line and allows the entry of variable D\$ as related to the dimensioned variable label, N.	6000	prints the message that the maximum file size for the array defined has been reached, and then sends the program to Line 900.
130	prints a blank line and allows the entry of variable E\$ as related to the dimensioned variable label, N.		
140-170	clear the screen and print the text with the variables entered in lines 100, 110, 120 and 130, respectively.		
180	prints the text at the desired locations.		
190	sets I\$ to an INKEY\$ function and tests the keyboard for the conditions found in this line. These conditions are used to correct any		

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lows punctuation in the variables entered. That's the only difference between the two commands.

Programming Exercise:

Using the methods presented in this article and the listing, write a program that will allow you to enter items you would want to list or find later in the program into arrays.

It is often difficult for new programmers (and, sometimes, old programmers, too!) to decipher the meaning of a line of BASIC code. I have embedded remark statements in the program shown in the listing to help. Refer to the chart on Page 24 for a line-by-line description.

In the final installment, Lesson IV, we will take this month's program, add data I/O, and enhance it further to allow easier data entry and correction.

Hints and Tips

Nothing puts a damper on a struggling beginner more quickly than trying to edit a program with BASIC's built-in editor. I find it cumbersome and difficult to use.

To make programming easier, you can use word processors such as *VIP* or *Telewriter* to write your programs. Save these programs in ASCII (SAVE "filename",A) with the proper extensions, etc. It may take longer to load and save, but the editing capabilities of these

programs make this a minor inconvenience.

Those of you who want to know more about the commands available for your computer can purchase the *TRS-80 Pocket Handbook* from Radio Shack (Cat. No. 62-2024). It is one of the best investments you can make to assist you in learning programming. And if you're interested in learning more about the peeks and pokes available for the Color Computer, I recommend you read *500 POKES, PEEKS 'N EXECs for the TRS-80 CoCo*, marketed by Microcom Software.

Remember: Work smarter, not harder! □

The listing: DATABASE

```
0 'BASIC NAME DATABASE PROGRAM.
THIS PROGRAM IS TO BE USED WITH
THE BASIC PROGRAMMING COURSE
WRITTEN BY DAVID W. OSTLER, COPY
RIGHT 1987
10 CLEAR1000:T=100:N=0:DIMB$(10)
:DIMC$(10):DIMD$(10):DIME$(10)
```

```
20 'CHECK FOR TAPE OR DISK SYSTEM
30 A=PEEK(188)
40 'CHECK FOR 16K OR 64K SYSTEM
50 B=PEEK(116)
60 IF(A=14 AND B=127) THEN GOSUB
1000
70 IF(A=6 AND B=127) THEN GOSUB1
010
80 IF(A=6 AND B=63) THEN GOSUB10
20
85 GOTO2000
95 'FILES ENTERED HERE
100 CLS:PRINT"ADDRESS DATABASE #
OF FILES";N:PRINT:LINEINPUT"ENTER
NAME
";B$(N)
110 PRINT:LINEINPUT"ENTER ADDRESS
";C$(N)
120 PRINT:LINEINPUT"ENTER CITY,
ST, &ZIP";D$(N)
130 PRINT:LINEINPUT"ENTER TELEPHONE
NO.
";E$(N)
140 CLS:PRINT:PRINT"1. NAME- ";B
$(N)
150 PRINT:PRINT"2. STREET-";C$(N)
)
160 PRINT:PRINT"3. STATE- ";D$(N)
)
170 PRINT:PRINT"4. PHONE- ";E$(N)
)
180 PRINT@357,"PRESS <C> TO CONT
INUE":PRINT@399,"OR":PRINT@416,"
PRESS THE NUMBER TO CORRECT"
190 I$=INKEY$:IFI$=""THEN10ELSE
IFI$="1"THEN300ELSEIFI$="2"THEN3
10ELSEIFI$="3"THEN320ELSEIFI$="4
"THEN330ELSEIFI$="C"THEN200ELSE1
90
200 N=N+1:IFN=10GOTO6000
210 CLS:PRINT@456,"ANOTHER ENTRY
```

About The One-Liner Contest . . .

THE RAINBOW'S One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be very short.

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```

(Y/N) "
220 I$=INKEY$:IFI$=""THEN220ELSE
IFI$="Y"THEN100ELSEIFI$="N"THEN9
00ELSE220
300 CLS:PRINT:PRINT:LINEINPUT"EN
TER NAME
";B$(N):GOTO140
310 CLS:PRINT:PRINT:LINEINPUT"EN
TER ADDRESS
";C$(N):GOTO140
320 CLS:PRINT:PRINT:LINEINPUT"3. STATE
- ";D$(N):GOTO140
330 CLS:PRINT:PRINT:LINEINPUT"EN
TER TELEPHONE NO.
";E$(N):GOTO140
900 FORB=0TO N-1
910 CLS:PRINT:PRINT"1. NAME- ";B
$(B)
920 PRINT:PRINT"2. STREET-";C$(B
)
930 PRINT:PRINT"3. STATE- ";D$(B
)
940 PRINT:PRINT"4. PHONE- ";E$(B
)
950 PRINT@355,"PRESS ANY KEY TO
CONTINUE"
960 I$=INKEY$:IFI$=""THEN960
970 NEXTB

```

```

980 GOTO2000
1000 CLS:PRINT@230,"32/64K DISK
SYSTEM":FORX=1TO1000STEP1:NEXTX:
RETURN
1010 CLS:PRINT@228,"32/64K CASSE
TTE SYSTEM":FORX=1TO1000STEP1:NE
XTX:RETURN
1020 CLS:PRINT@229,"16K CASSETTE
SYSTEM":FORX=1TO1000STEP1:NEXTX
:RETURN
2000 CLS:PRINT:PRINT" WELCOME TO
THE BASIC DATABASE ":PRINT:PRIN
T" WOULD YOU LIKE TO:":PRI
NT:PRINT:PRINT" S)TART A NEW
DATABASE":PRINT:PRINT" E)
ND THIS PROGRAM":PRINT@458,"[SEL
ECT ONE]"
2010 I$=INKEY$:IFI$=""THEN2010EL
SEIFI$="S"THEN95ELSEIFI$="E"THEN
5000ELSE2010
5000 CLS3:PRINT@224," REBO
OTING TO BASIC":SOUND200,2:SOUND
100,3:FORX=1TO1000STEP1:NEXTX:CL
S:END
6000 CLS0:PRINT@224," MAXIMUM
FILE SIZE REACHED":SOUND200,2:S
OUND100,3:FORX=1TO1000STEP1:NEXTX
:GOTO900

```

WORLDPORT 1200

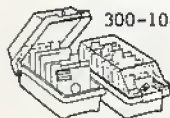
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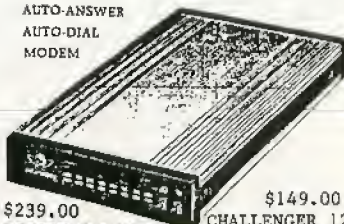
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Let CoCo calculate friendship compatibility

Compu Match

By Robert Rogers

Sample Questionnaire

Friendship Matching Service
name
sex M F
homeroom number

(1) What kind of music do you listen to?

- 1- hard rock
- 2- soft rock/pop
- 3- country
- 4- classical, oldies, and others

(2) What type of movies do you like?

- 1-science fiction/fantasy
- 2-comedy
- 3-drama/romance
- 4-action/horror

(3) Which accurately describes you?

- 1-popular and outgoing
- 2-wild and crazy
- 3-quiet, cautious, and sensitive
- 4-middle of the road

(4) What is your political philosophy?

- 1-conservative
- 2-liberal
- 3-moderate
- 4-anarchist

(5) What do you look for most in a friend?

- 1-companionship
- 2-generosity
- 3-loyalty and understanding
- 4-sense of humor and vitality

Compu Match is a program designed to match people who give similar responses to a questionnaire, and is aimed especially at clubs and organizations that want an interesting project or a way to raise money without selling trinkets or candy.

My high school computer club had good results using a similar program called *Computer Friendship Matching Service*, which I wrote for the IBM. We gave it the long name to convey that the program was just for fun, and to avoid the problems and negative connotations of a dating service.

Participants fill out questionnaires by answering multiple-choice questions about their personality, lifestyle and interests. Each person's data is entered into the computer. Then the program prints, for each participant, a list of five people of the opposite sex who had the

Robert Rogers is a self-taught programmer who is currently attending Florida Atlantic University, majoring in computer science. His interests include model railroading and playing the organ professionally.

highest percentages of similar responses.

I have included a five-question sample questionnaire, which you can use for a test run (five males and five females are needed in the file to avoid errors when matching). More questions are needed for the "real" run.

Upon running, you are asked what filename you are using. You must use the same filename when adding additional data. In order for the program to work on a 16K machine, the CLEAR 10000 and LM=500 statements in Line 10 require some modification — lower values. LM is the number of participants. If memory is limited, you could divide up the pool of participants by age or grade and use separate files. (Note: Participants can be matched only with others in the same file.)

A good promotion for your matching service is having the faculty participate (in a separate file) — this will yield hilarious results.

Next you are asked how many questions are on the form (maximum of 25) and the largest number of response choices for any one question (maximum of nine). A menu of six options appears.

Function 1 allows initial data to be entered and new data to be added. Enter the person's name, sex (M or F) and code number (we used homeroom numbers). Then, in sequence, type the responses. Use numbers, *not* letters. You won't need to press ENTER after each response. You can back up to correct a mistake by pressing the up arrow; the prompt includes the response number, so you will always know which one you are entering. No correcting is allowed after all the responses are entered.

Function 2 is the actual matching process. It prints to the screen or printer the top five match-ups and corresponding percentages for each participant. If you use the printer, the printouts can be delivered personally. To speed the process, males and females are done separately — you can select which to print first. So, to cover everyone, use Function 2 twice, selecting "female" first, and "male" next. You also have the option of starting with a specific "match position." Pressing ENTER begins printing the results for the first male or female in the file.

To have printing begin elsewhere in the file, enter the desired record number obtained with Function 3. The match position option enables you to print out a partial listing of participants and then continue where you left off later (this is

COMPUTER MATCHING

NAME: BILL WILSON
CODE NO: 210
SEX: M

RANK	NAME	NO.	PERCENTAGE
1	EMBRY JOHNSON	215	60
2	SUSAN AUBREY	210	40
3	CINDY JEFFERS	196	40
4	CATHY SPARKS	198	20
5	THERESA OLSON	195	0

COMPUTER MATCHING

NAME: GARY SMITH
CODE NO: 217
SEX: M

RANK	NAME	NO.	PERCENTAGE
1	CATHY SPARKS	198	20
2	SUSAN AUBREY	210	20
3	EMBRY JOHNSON	215	20
4	THERESA OLSON	195	20
5	CINDY JEFFERS	196	20

COMPUTER MATCHING

NAME: JOHN DOE
CODE NO: 186
SEX: M

RANK	NAME	NO.	PERCENTAGE
1	SUSAN AUBREY	210	40
2	THERESA OLSON	195	40
3	CATHY SPARKS	198	20
4	EMBRY JOHNSON	215	0
5	CINDY JEFFERS	196	0

harder to explain than it is to see in operation). The disk containing the data file *must* remain in the disk drive.

Function 3 lists to the screen or printer all the participants' data and file record numbers. These are not needed to use *Compu Match* unless you use the "match position" option previously described or need a file dump for debugging.

Function 4 allows you to print results for the person whose name you input. This could be used if a printout is lost or if you decide to have people line up at the computer to watch the results appear on the screen.

Function 5 is an extra feature that will compute for each question the percentage of participants that choose each response — it can be computed for males, females or both combined. These statistics can then be announced or printed in a newsletter or school newspaper for the general interest. This function could be used by itself (without using the matching process) as a quick questionnaire tabulator.

Function 6 should be used to end operation and ensure proper file closing.

(Questions or comments about this program may be directed to the author at 10228 Anthony Groves Road, West Palm Beach, FL 33414. Please enclose an SASE when writing for a reply.) □

QUESTION: 1		
1 : 2	20.0 %	
2 : 3	30.0 %	
3 : 2	20.0 %	
4 : 3	30.0 %	
QUESTION: 2		
1 : 3	30.0 %	
2 : 5	50.0 %	
3 : 1	10.0 %	
4 : 1	10.0 %	
QUESTION: 3		
1 : 1	10.0 %	
2 : 0	0.0 %	
3 : 5	50.0 %	
4 : 4	40.0 %	
QUESTION: 4		
1 : 3	30.0 %	
2 : 4	40.0 %	
3 : 1	10.0 %	
4 : 2	20.0 %	
QUESTION: 5		
1 : 1	10.0 %	
2 : 5	50.0 %	
3 : 3	30.0 %	
4 : 1	10.0 %	

✓	160	.....167	4030	.....74
	1120	.....242	7050	.....189
	3005	.....188	END	.....233

The listing: MATCH

```

1  '*****
2  '*          COMPU MATCH          *
3  '*
4  '*  COPYRIGHT (C) 1984  BY  *
5  '*          ROBERT  ROGERS      *
6  '*  VERSION 1.3      JULY 1986 *
7  '*  TANDY COLOR COMPUTERS W/  *
8  '*  16K  DISK EXTENDED BASIC  *
9  '*****
10 CLEAR10000:VERIFYON:LM=500:DI
MA$(LM),0(9):'LM=#PARTICIPANTS,
CHANGE TO FIT MEMORY OF 16K COCO
20 CLS:PRINT@224,"FILE NAME TO B
E USED:":LINEINPUTFI$:IFLEN(FI$
)>8THENSOUND1,5:RUN
30 CLS:PRINT@224,"HOW MANY QUEST
IONS:":INPUTI:IFI<1ORI>25THENSO
UND1,5:GOTO30
40 CLS:PRINT@224,"HOW MANY RESPO
NSE CHOICES:":INPUTRC:IFRC<1ORR
C>9THENSOUND1,5:GOTO40
100 CLS:PRINTSTRING$(32,191)"
      COMPU MATCH":PRINTSTRING
$(32,191);
110 PRINT:PRINT" (1) ENTER DATA
120 PRINT" (2) RUN MATCHING PROC
ESS
130 PRINT" (3) LIST DATA
140 PRINT" (4) MATCH ONE PERSON
150 PRINT" (5) COMPILE STATISTIC
S
160 PRINT" (6) END SESSION
180 PRINT@358,"SELECT OPTION (1
-6)
190 PRINT@448,STRING$(32,191)"
(C)1985 BY ROBERT ROGERS";
200 K$=INKEY$:IFK$=""THEN200
210 K=VAL(K$):IFK<1 OR K>6 THEN2
00
220 ON K GOSUB1000,2000,4000,600
0,9000,3000
230 GOTO1000
300 CLS:END
1000 GOSUB7000:X=LOF(1)
1001 CLS:DD$=""
1002 IFX+1=LM THENCLOSE#1:PRINT@
224," NO MORE PARTICIPANTS ALLO
WED":SOUND1,30:GOTO1000
1010 LINEINPUT"NAME:":NN$:IFNN$=
""THENCLOSE#1:GOTO1000
1020 LINEINPUT"CODE NUMBER:":HH$
1030 LINEINPUT"SEX:":SS$:SS$=LEF

```

```

T$(SS$,1):IFSS$<>"M"ANDSS$<>"F"
HEN1030
1040 T=0
1100 T=T+1:IFT=I+1THEN1140
1110 PRINT"RESPONSE" T:";
1120 F$=INKEY$:IFF$=""THEN1120
1121 IFF$=CHR$(94)THEN1125
1122 IF(VAL(F$))<1OR(VAL(F$))>RC
THEN1120
1125 DD$=DD$+F$
1126 IFF$=CHR$(94)THENPRINT:T=T-
1:IFT<1THENT=1:DD$="":GOTO1110:E
LSEDD$=LEFT$(DD$,LEN(DD$)-2):GOT
O1110
1130 PRINTF$
1135 GOTO1100
1140 X=X+1:GOSUB8000
1150 GOTO1001
2000 CLS:PRINT@229,"<P>RINTER OR
<S>CREEN
2001 V$=INKEY$:IFV$="S"THENV=0:C
LS:ELSEIFV$="P"THENV=-2:ELSE2001
2005 CLS:PRINT@231,"<M>ALE OR <F
>EMALE
2006 SS$=INKEY$:IFSS$="M"THENOS=
"F":ELSEIFSS$="F"THENOS="M":ELSE
2006
2010 GOSUB7000:L=LOF(1):M=0
2020 FORT=1TOL:GET#1,T:IFS$=O$TH
ENM=M+1:A$(M)=D$+STR$(T)
2025 NEXTT:IFF=1THENX=0:GOTO3000
2110 CLS:PRINT@224,"":LINEINPUT
"MATCH POSITION:":C$:C=VAL(C$):I
FC<1THENC=1:ELSEIFC>L THENC=L
2120 X=C-1
3000 X=X+1:PRINT@0,X:;IFX=L+1THE
NCLOSE#1:GOTO1000
3001 GET#1,X:IFS$<>SS$THEN3000:E
LSEU$=N$:I$=H$
3005 IFF=1THENIFINSTR(1,N$,M$)<1
THEN3000
3010 FORQ=1TO5:P(Q)=0:PP(Q)=0:NE
XTQ
3015 T=0
3020 T=T+1:R=0:IFT=M+1THEN3120
3030 FORQ=1TOI
3040 IFMID$(D$,Q,1)=MID$(A$(T),Q
,1)THENR=R+1
3050 NEXTQ
3060 P=(R/I)*100:Y=0
3070 Y=Y+1:IFY=6THEN3110
3080 IFP<P(Y)THEN3070
3090 FORZ=5TOY STEP-1:P(Z+1)=P(Z
):PP(Z+1)=PP(Z):NEXTZ:P(Y)=P:PP(
Y)=VAL(RIGHT$(A$(T),(LEN(A$(T))-
25)))
3110 GOTO3020
3120 GOSUB5000
3130 GOTO3000
4000 CLS:PRINT@229,"<P>RINTER OR

```



```

<S>CREEN
4005 V$=INKEY$:IFV$="S"THENV=0:CLS:ELSEIFV$="P"THENV=-2:ELSE4005
4010 GOSUB7000
4030 FOR T=1 TO LOF(1):GET#1,T:PRINT#V,N$:PRINT#V,T" "D$;" "S$;" ";H$
4035 IFV=0 THEN IF PEEK(338) <> 191 THEN POKE 338,255:GOTO 4035
4040 NEXT T:CLOSE#1
4999 EXEC 44539:RETURN
5000 CLS:IFV=-2 THEN PRINT#V,TAB(31)"COMPUTER MATCHING
5010 PRINT#V
5020 PRINT#V,"NAME: "U$
5030 PRINT#V,"CODE NO: "I$
5040 PRINT#V,"SEX: "SS$
5041 IFV=0 THEN GOTO 5200
5050 PRINT#V:PRINT#V," RANK","NAME","NO.," "PERCENTAGE":PRINT#V,STRING$(80,"-")
5060 FOR Z=1 TO 5:GET#1,PP(Z)
5080 PRINT#V,Z,N$,H$,P(Z)
5090 NEXT Z:PRINT#V:PRINT#V
5100 RETURN
5200 FOR Z=1 TO 5:GET#1,PP(Z)
5210 PRINT#V:LEFT$(N$,25):PRINT#V,"O.:"H$ "PERCENTAGE MATCH:"P(Z)
5220 NEXT Z
5230 IF PEEK(338) <> 191 THEN POKE 338,255:GOTO 5230 ELSE POKE 338,255:CLS:RETURN
6000 CLS:PRINT@224,"NAME OF PERSON TO MATCH:":LINE INPUT M$
6010 F=1:GOTO 2000
7000 OPEN "D",#1,FI$,60
7010 FIELD#1,30ASN$,4ASH$,25ASD$,1ASS$
7040 L=LOF(1)
7050 RETURN
8000 LSETN$=NN$:LSETH$=HH$:LSETD$=DD$:LSETSS$=SS$
8010 PUT#1,X
8015 RETURN

```

```

9000 CLS:PRINT@229,"<P>RINTER OR <S>CREEN
9010 V$=INKEY$:IFV$="S"THENV=0:CLS:ELSEIFV$="P"THENV=-2:ELSE9010
9020 CLS:PRINT@200,"STATISTICS FOR ":"PRINT@229,"<M>ALE <F>EMALE <B>OTH"
9030 B$=INKEY$:IFB$<>"M"ANDB$<>"F"ANDB$<>"B"THEN9030
9040 CLS:N=0:GOSUB7000
9050 FOR Q=1 TO I:FOR K=1 TO R:O(K)=0:NEXT K:FOR T=1 TO L
9060 GET#1,T
9070 IFB$="F"THEN IF S$="F"THEN IF Q=1 THEN N=N+1:GOTO 9090:ELSE GOTO 9090 ELSE9100
9080 IFB$="M"THEN IF S$="M"THEN IF Q=1 THEN N=N+1:GOTO 9090:ELSE9090 ELSE9100
9085 IFQ=1 THEN N=N+1
9090 K=VAL(MID$(D$,Q,1)):O(K)=O(K)+1
9100 NEXT T:PRINT#V,"QUESTION:"Q:FORK=1 TO R:PRINT#V," "K":O(K),:PRINT#V,USING"###.##";(O(K)/N)*100;:PRINT#V,"%":NEXT K
9110 IFV=0 THEN IF PEEK(338) <> 191 THEN POKE 338,255:GOTO 9110
9120 NEXT Q:CLOSE#1:GOTO 1000

```

STOCK MARKET PORTFOLIO FOR THE COLOR COMPUTER

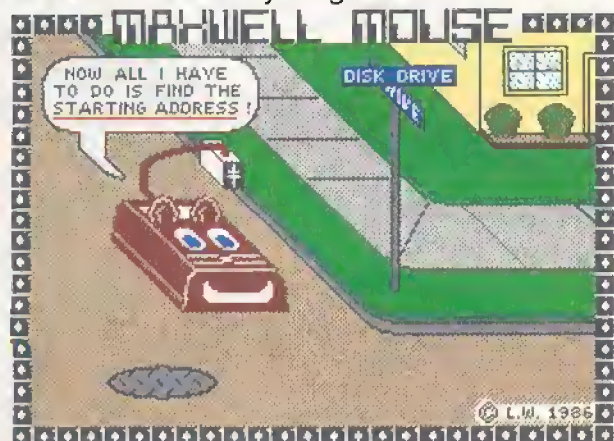


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Mouse Tales By Logan Ward



The logo for RAINBOWfest is the central focus. The word "RAINBOW" is in large, yellow, outlined letters, and "FEST" is in large, red, outlined letters. A rainbow arches over the word "FEST". Above the rainbow, a yellow cat (CoCo Cat) is lying down, looking towards the right. The background is a blue sky with white clouds, a blue balloon, and a red balloon. Below the main title, the text "CHICAGO" and "MAY 20-22" is written in yellow on a black background.

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RAINBOWfest is a **great opportunity** for commercial programmers to **show off new and innovative products for the first time**. Chicago is the show to get information on capabilities for the new CoCo 3, along with a terrific selection of the latest CoCo 3 software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **Educational Sandbox**, which features **child-oriented workshops** to give hands-on experience to an age group often neglected. There are sessions for the kindergarten through third-graders, and for fourth- through sev-

enth-graders. And, as an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The Hyatt Regency Woodfield offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 4 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!

SPECIAL EVENT!

COCO GALLERY LIVE SHOWCASE YOUR BEST AT RAINBOWFEST

We are taking the popular "CoCo Gallery" on the road to RAINBOWfest Chicago — and we'd like you to submit your own graphics creations to be exhibited at the show!

RULES

- You can enter color or black-and-white photographs or printouts of your original artwork produced on the CoCo 1, 2 or 3. Entries should be framed, mounted or matted, and may not be smaller than 5-by-7 inches or larger than 11-by-14 inches.
- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is **not** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries may be mailed to THE RAINBOW before May 1, 1988, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, May 21.
- Your work will be returned if sent with a postage paid return envelope, or entries can be picked up at the close of the show — Sunday, May 22 at 4 p.m.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, May 22, and winning entries will be published in the September '88 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

YES, I'm coming to Chicago! I want to save by buying tickets now at the special advance sale price. Breakfast tickets require advance reservations.

Please send me:

_____ Three-day tickets at \$9 each	total _____	Name _____ (please print)
_____ One-day tickets at \$7 each	total _____	Address _____
Circle one: Friday Saturday Sunday		City _____ State _____
_____ Saturday CoCo Breakfast at \$12 each	total _____	Telephone _____ ZIP _____
_____ RAINBOWfest T-shirts at \$6 each	total _____	Company _____
(Advance sale-priced T-shirts must be picked up at the door)		<input type="checkbox"/> Payment Enclosed, or Charge to:
Handling Charge \$1 _____		<input type="checkbox"/> VISA <input type="checkbox"/> MasterCard <input type="checkbox"/> American Express
TOTAL ENCLOSED _____		Account Number _____
(U.S. Currency Only, Please)		Exp. Date _____
<input type="checkbox"/> Also send me a hotel reservation card for the Hyatt Regency Woodfield (\$64, single or double room).		Signature _____

Advance ticket deadline: May 13, 1988. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.

The Vote Is In



By Cray Augsburg
Adventure Contest Judge

Ladies and gentlemen! Your attention please! The scores have been tallied and the results are in. The winner of The Fourth RAINBOW Adventure Contest is. . .

Hold on there, not so fast! In the tradition of Adventures, there is no instant gratification, no easy win. Judging this contest was much like playing an Adventure — many things to explore and no obvious solutions. So why should I tell you right off the bat who won? We'll get around to it.

After a considerable amount of time and effort, I finally reached my decisions, which weren't easy to make. Each Adventure had its own unique and interesting aspects, and it was really easy to like them all. So, I had to force myself to consider each entry as a complete package.

In judging the contest, I knew the winner would be the person who sent in the most well-rounded entry. The use of graphics was not a requirement. However, the winning entry would be comprised of complete documentation, an original concept or theme, and logical design and organization. It would be a testament to the author's programming skills, yet be easy for the user to operate. I feel the winner of The Fourth RAINBOW Adventure Contest came through with flying colors on all counts.

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

What's an Adventure?

It's simply a game, but not necessarily a simple one. Playing an Adventure requires a certain level of skill and cunning. Since the concept of the game is not grounded in reality, you must be ready for the unexpected to pop up at any time. It all depends on the author's understanding of how the average human mind works. Just when you think you've got it solved, you find something else is required of you — something that makes the least (or, depending on how you look at it, the most) sense. Adventures can be quite frustrating.

The goal in writing an Adventure is to capture the Adventurer and take him right to the frustration threshold — where he's just about ready to put his foot through the keyboard — and then give him a faint glimmer of hope. Let him gain a little, then start the process again. This is what keeps Adventurers coming back for more, and is also a sign of a well-written Adventure.

Obviously, programming an Adventure takes quite a bit of effort. The author must be knowledgeable and clever, and must understand programming concepts and skills; otherwise, you might find the solution just by looking at the program listing. The good Adventure writer will invent a story line that stretches the imagination.

I am proud to say the level of quality in the entries we received was unbelievably high. However, this only made the decisions that much harder to make. So many people deserved to win, but only one could take home the grand prize. In the spirit of competition, though, everyone was a winner. If you sent in an entry, give yourself a pat on the back for a job well done — you deserve it.

The Entries

What kind of Adventures did we see? We saw plenty of graphics! As a matter of fact, most of the Adventures submitted utilized graphics in one way or another. Of the many CoCo 3 entries, nearly 90 percent were graphics Adventures — and most were darn good, too! Creative use of graphics never fails to please people. The CoCo 1 and 2 graphics Adventures were something to behold, as well. It never fails to amaze me what can be done with a simple PMODE4 screen and a few artifactual colors.

Now, lest we concern those who did not use graphics, remember that the "original" computer Adventure game had text only. The use of graphics has never been necessary to an Adventure's

success. It is true that graphics enhance a program, but they are not necessary. In many cases, it is better to let the Adventurer's imagination create the scene. In fact, graphics can sometimes distract the player. Often it is best to let the readers' impressions of the events help them create mental pictures.

As far as equipment requirements, the entries varied. Some Adventures ran in 4K without Extended Color BASIC, and others squeezed every available byte out of a 128K CoCo 3. We did not receive any entries written under OS-9, which is somewhat surprising considering BASIC09's power and flexibility. Oh well, that's a story for another day.

Some entries used music and sound effects. Being musically inclined, I had hoped to hear some fancy 12-voice music. It wasn't to be. (Maybe we can have a music programming contest someday). For the most part, though, the music and sound effects used were very appropriate.

The level of programming found in the entries was really amazing. It is fascinating to see a skilled programmer's work. I can imagine the programmer hovering over his keyboard like a concert pianist. And mastery of the CoCo ivories has certainly been evidenced by the compositions I "heard."

While most of the commands used in the entries we received would be familiar to even the most inexperienced Adventurer, some programmers broke new ground. Along with the old faithfuls (GO and INVENTORY) were SAY, SPEAK, GOBBLE and COMPUTE. In addition, some programmers abandoned the old "type-it-in" approach for the new "point-and-click" powers of the joystick and mouse. Our grand prize winning entry utilizes icons in a very easy-to-understand and realistic way and requires keyboard entry only when absolutely necessary.

From the standard tricks of using hundreds of GOSUBs to poking the key routines in machine language, no holds were barred as the entrants scrambled to keep their secrets intact. And what is their motivation? While they would never admit it, they just want to make you work. I think that's fair — they worked hard to bring you the best they had to offer, and they want to make sure you enjoy it!

In relation to this, I must give advance notice: RAINBOW is not in any way, shape or form going to give you the solutions! That would just be the easy way out. Hints may be offered in

"Scoreboard Pointers," but the brunt of the work remains with you, the Adventurer. That, after all, is the whole point. Try to outguess the author in each case. He does have the upper hand, but he hasn't made the game impossible. I guess what I'm really saying is: *Enjoy!* And now for the winners.

CoCo 3 Graphics Best of Show and Grand Prize is presented for the second consecutive time to Dr. Bruce Bell, an optometrist from Rockmart, Georgia. Dr. Bell's work has graced the pages of THE RAINBOW several times in the past. And each time he has done himself a little better. Dr. Bell did a professional job with this year's winning entry, *The Controllers* (see Page 42). His organizational and programming skills do not go unnoticed.

The Controllers is set "slightly" into the future. Your character is a scavenger in a time when technology has been banished from the Earth — the planet was overtaken by an alien race that uses thought control to reduce humans to primitivism. Your goal is to free the human race from this control.

Dr. Bell's entry is written for the CoCo 3 and will work with color composite or RGB monitors, as well as tape or disk. A mixture of graphics, text and sound gave this entry an edge in the competition. More importantly, the use of a joystick/mouse user interface gave it the final push into the winning position. While the use of such an interface is not unique in itself, the appropriate manner in which it is implemented here must be seen to be appreciated.

The Controllers is comprised of two BASIC programs, one of which "sets up" the system. The other program is the main body of the Adventure, which features games within itself. To achieve a fine balance between program features and efficiency, Dr. Bell utilized many techniques, including some dabbling into the "deep, dark world" of machine language. We commend Dr. Bell for his excellent work and hope to see more programs from him in the future.

Non-Graphics Best of Show goes to Jeff Hillison, of Blacksburg, Virginia, for his entry, *Intrigue*. This Adventure casts you as an allied spy stuck in Berlin in the midst of WWII. Your mission is to find the plans for the impending German invasion of Britain.

Clues in the form of a letter and burlesque show guide accompanied this entry; these clues are required to solve

the Adventure, and add a certain sense of realism to the game. Jeff also uses several interesting commands. Never before have I seen SHAKE and FLUSH used in an Adventure, but they are here.

This Adventure is not an easy one to solve. (OK! Yes, I had to cheat and look at the solution.) With 60 rooms, nearly 90 different objects and over 30 commands at your disposal, the play can get quite complex. I thoroughly enjoyed this Adventure.

Jeff is a freshman at Virginia Tech, where he is majoring in accounting. He has been working with the CoCo since 1983, and wrote his first Adventure in 1985.

CoCo 3 Graphics Runner-Up and Second Place go to Charles Farris. His entry, *Term Paper*, had a very interesting story line: You are a student at CoCo State University and someone has stolen your term paper. You must search the campus and retrieve all 30 pages of the paper before it is due.

I really empathized with the character in this Adventure. I don't know how many times "the dog ate my term paper, honest!" The play was enjoyable and interesting, incorporating levels of ability within the character: Fighting Factor, Health Points, Personality Points and Money Amount.

The University is shown in the form of an onscreen map, but the locations of the pages are not given. As you move around the campus, you will be struck by the realism of the game.

Charles is a self-taught BASIC programmer who has enjoyed programming his CoCo for the last three years, and is currently with the U.S. Air Force, stationed overseas in Europe.

Third Place goes to Dr. Eugene A. Carver, from Galena, Ohio, for *SDI — Countdown to Doom*: A criminal mastermind has overtaken NORAD at Cheyenne Mountain, and you must stop his native country from demolishing civilization as we know it. You think

you are alone in your mission, but are you? The solution requires a great deal of thought, and the game never fails to twist and turn just when you feel the end is near.

An efficient, yet sometimes evasive, programming style combined with a great deal of thought earns this entry its proper place in the contest. I especially liked some of the references to real-life current events. Everyone who liked *Wargames* will certainly find themselves easily caught up in this one.

Dr. Carver is an editor at Chemical Abstracts Services, where he translates chemistry articles from Russian and German to English. He received his doctorate in physical chemistry from the University of Chicago in 1974.

CoCo 1/2 Graphics Best of Show goes to Mike Cooney, of Mansfield, Ohio, for his entry, *The Eye of the Opal*. You, Lwither, must find the special opal ring in order to make a proper proposal to Penelope. This requires what looks like an ordinary trip through an average sewer system (oh, boy!).

This Adventure is much more difficult than it might seem, but if you catch on to what Mike is doing, you will find it is really quite straightforward. The graphics are appropriate and some quite ornamental.

The Eye of the Opal starts out much like most other Adventures, but soon takes on its own character as surprise after surprise comes your way. And many aspects of the game are random, which always makes for fun, if frustrating, play.

Mike is a self-taught programmer and a junior in high school. In addition to his enthusiasm for computers, Mike's hobbies include art and music.

CoCo 1/2 Graphics Runner-Up goes to Paul Ruby, Jr., of Beeville, Texas, for *Foundation of Failure*. This 32K Adventure utilizes colorful PMODE 3 graphics to illustrate the rather large labyrinth in which your character travels. Each of

the 250 caverns is shown in perspective and may or may not contain one of the treasures you are seeking or an enemy you are trying to avoid.

The programming and presentation style is fairly original and lends itself well to this particular game. As you travel through the caverns in an attempt to save your village on the surface, you will learn to accept failure as well as triumph.

Paul is the founder of Ruby Software and Consulting, and he works with BASIC, dBASE and assembly language. His company consults with businesses about the creation and installation of accounting systems.

16K Best of Show goes to Chinarut Ruanghotvit, a 14-year-old from Ramsey, New Jersey, whose entry, *The Castle of Death*, can be found on Page 65. The complexity of this Adventure is hidden. Only as the game progresses do you begin to realize how lost you can get. Those of you who don't believe in mapping your travels, be warned. The programming style of this Adventure is typical of its size, but includes some new twists that other programmers can appreciate.

The story involves (as do many other Adventures) finding lost jewels. The solution is not readily apparent, but is, in fact, quite simple. Many traps await the Adventurer who becomes too greedy or obsessive.

I especially liked the addition of a descriptive term in some of the command lines. For example, since any room may have a door or window in several directions, the user can enter OPEN LEFT DOOR to open the door leading to the left. *The Castle of Death* serves as a useful model for those interested in learning how to create their own Adventures.

16K Runner-Up goes to Richard John Kottke, of Madison, Wisconsin, for his entry, *Captain Rodgers*. This two-part Adventure involves quite a bit

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Each disk is only \$6.00. Send cash, check or money order today to Bill Bernico Software 708 Michigan Ave. Sheboygan, WI 53081

Hint . . .

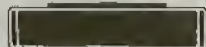
A Sticky Problem

Are you having problems with disk labels that come loose from the disk or don't want to stick at all? I was until I started using a thin film of rubber cement. Just apply it carefully to the area where you want to affix the label. Let the rubber cement dry and, when it has done so, put your label on. The rubber cement provides a good bonding surface for the "sticky" already on the label.

Ron Hemenway
Tacoma, WA

Color Connection

by BJ Chambliss



This is the most comprehensive modem package for the Color Computer!

All are Protocols Supported including CompuServe Protocol B, XMODEM protocol, and XON/XOFF. Auto dial feature for both Hayes compatible and some Radio Shack modems. You can use **all baud rates** when using the Radio Shack Deluxe RS232 program pack! Printer baud rates are selectable.

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Hi-Res screens with a choice of colors are used. All printable characters available and all control characters are supported.

RSDOS Version includes two sets, one for CoCo I and CoCo II, the other for CoCo 3.

OS-9 Connection 3.0:

The package includes all of the features of the RSDOS version plus runs on OS-9! Versions for both Level I and Level II are included. RS232 pak is required.

RSDOS Disk

\$49.95

OS-9 Disk

\$49.95

Also available from Radio Shack through Express Order Software



Data Master

by BJ Chambliss

Simplify with pull-down menus

All options are available from anywhere in the program. To make it even simpler, each menu option can be invoked by a single character!

Dialog boxes

Pop-up windows display current settings and available choices.

Unique LIST display format

You view data in easy-to-read rows & columns. From this easy-to-read screen you may edit your data, without having to exit. Mass changes are a snap!

For even more power, use an access key to selectively display a subset of records and can change them right on the screen!

Compatibility with OS-9 Profile & Data Bank

You won't lose any of your valuable data!

Easy Expansion

with re-definition of records and transfer of files.

Elements & Records:

Each record can contain up to 512 characters used within 35 elements. Elements are defined as: alphanumeric (descriptive data), math (real numbers including dollars & cents), date, and derived (formulas calculated from other elements in the same record). You can store any type of data using these field types!

- **Closing Commands** let you exit the editor with or without save, and can import or export files whenever you need them.
- **Smart Speller** is included.
- **Parameter commands** personalize your environment.
- **Access the OS-9 Shell.**
- **Up to 10 functions keys** can be defined by CoCo 3 users for fast, repetitive functions.
- **Use with the Text Formatter** for a full word processing team. Simply imbed the Text Formatter commands in your Screen Star file and it will be printed in style!
- **Level 1 & Level 2** are supported and both versions are included.

Requires OS-9 Disk
With Text Formatter

\$49.95
\$74.95

Display & Entry Screens

Design up to 9 different screen formats for data display and data entry for each data base. This is helpful for accessing your data for different purposes.

Sorts & Selections:

Up to 9 different access keys can be defined. These are used for displaying data on the screen or selecting data for printing. You may use several levels of sorts as well as logical operators to select just the right data. A powerful generic search is also available.

Reports:

See your data any way you want by designing your own reports! Data Master offers easy-to-use tools to design professional reports including report headings, titles, column headings, automatic page numbers, column totals, and more. Store up to 9 report formats for each data base.

File Management

Built-in file management capabilities allow easy file manipulation for transferring data files, renaming data files, expanding data files, and more.

Upload/Download

Data Master can read and write standard sequential files which aids in data transfer between DynaCalc and many others.

Full keyboard ease

taking full advantage of the CoCo 3's cursor and function keys.

OS-9 accessible

Even while operating within Data Master

Requires OS-9 Level II,
CoCo 3, 512K

\$64.95



Screen Star

by Scott Cabit

Also available from Radio Shack through Express Order Software

Screen Star implements the popular WordStar editing capabilities. If you know WordStar you already know how to use Screen Star!

- **Edit files larger than memory** since Screen Star uses the disk as an extension of memory.
- **Block Commands** - with a keystroke you can mark the start and end of a block, then move, copy, or delete the block.
- **Cursor Movement** is easy with an array of commands to move left or right one character, or one word, or one line; scroll forward or back one line, one screen, one block; jump to the start or end of the line or the screen, block, or file.
- **Find & Find/Replace Commands** make mass changes and searches a snap.
- **Pop-Up Help Menus** are as close as a keystroke.

Requires OS-9 Disk
With Text Formatter

\$49.95
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OS-9 Text Formatter

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An easy way to get beautiful documents and letters with OS-9. Text Formatter interfaces with any editor that produces standard ASCII text files.

Features include left and right **justification**, page breaks, special spacing, automatic **pagination**, automatic **page numbering**, **centering**, **indenting**, **tabs**, and sending **escape and control codes** to your printer as well as sophisticated **headers and footers**. Special functions include macros for often used sequences, relative arguments, upper and lower case modes, nonprintable remarks, and more!

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Checks are delayed for bank clearance

of detail and realism. While it requires careful, logical thought on the part of the Adventurer, the play is very straightforward. The game takes you from a swamp to a space station if, of course, you manage to survive the little surprises along the way.

Richard is a midshipman in the naval ROTC unit at the University of Wisconsin, where his major course of study is electrical engineering. He aspires to join the Navy's nuclear power program upon graduation.

Non-Graphics Runner-Up goes to Stephen Berry, of Lake Jackson, Texas, for *Life: An Everyday Adventure*. The amount of work put into this large entry is quite obvious. And the goal of the Adventure, making your way through life, really hit home; it impressed upon me the things we take for granted and the work we do each day that we don't even recognize.

Life: An Everyday Adventure was designed for the CoCo 3 and requires a disk drive, but it certainly uses every bit of the resources available in such a system. The program represents an undertaking worthy of praise.

In real life, Stephen is a 17-year-old senior at Brazoswood High School.

Best in a Continuing Series goes to Fred D. Provoncha, of Lynbrook, New York, for *Aandark II*. (His original Adventure, *Aandark*, was a winner in The Third RAINBOW Adventure Contest.) This 32K Disk program details the continuing saga of the planet Aandark and its attack and occupation by the Dorax. You must disable the cannon in order for the Terran fleet to get through. I liked the first entry in this "series," and *Aandark II* provides the same level of enjoyment. It is well-written and well-deserving of our attention.

The Chase in the Park Award goes to Mike Anderson, of Tucson, Arizona, for *The Park of Mystery*, a 32K Adventure. In this Adventure, you have overheard a discussion between shady characters that "describes" where they have hidden their loot. You must find the money before they find it . . . or you. You must keep your "happy face" on while playing. Getting too serious just might spoil your chances for success. I believe *The Park of Mystery* exemplifies a programming style and efficiency we all could strive for. Mike is a return winner. His entry, *The Adventure of Johnny Zero*, was a winner in The Third RAINBOW Adventure Contest.

The Halloween Revisited Award is won by David Bartmess, of Fayetteville, Pennsylvania, for *Ghost House*. David must have a passion for haunted houses and those neat little scares. This 16K text Adventure invites you to try to find various treasures located in the ghost house. A very handy and unique aspect of the game is its ability to accept multiple commands on one line. I thought this ability was interesting — it is good to see novel ideas incorporated into such software.

The Sleeper Award goes to Tio Babis, of Miller Place, New York. His entry, *The Parlog Building*, is a 32K text Adventure in which you are trapped on a military base. Your only goal is to escape unharmed. It is just a little trickier than imagined, though. The input routine on this game allows you to enter fully descriptive commands or shorten them to a simple noun/verb combination. *The Parlog Building* is a good warm-up Adventure for the hardy Adventurers and an excellent learning tool for novices.

The Space Wars Awards goes to Andre Needham for his work on *General Panic*. Andre, who lives in Renton, Washington, has put together quite a sophisticated 16K text Adventure in this entry. Your goal is to retrieve some antimatter necessary for the Earth's power. This is a "typical" Adventure with a good story line. It is well-written and should be enjoyable to most any Adventurer.

The Architect of the Year Award goes to Eric Santanen, of Stanhope, New Jersey, for *House Adventure*. Essentially, you are stuck in an old, abandoned house and must find a way out. But this house is quite a bit more complex than it seems. Eric took special care in writing this 32K text Adventure to make sure the solution could not be discovered before the game was played (unless you had the solution sheet, like me!). This game is rather involved, but once you discover the solution, the trials and tribulations begin to make sense.

The Flipper Award goes to Ken Lie, from Gates Mills, Ohio. Ken's entry, *Operation: Ocean Master*, involves quite a bit of "spook" stuff (I do love the underworld and the enchanting image of intrigue offered by "special operations"). In this 32K text Adventure, you are a special operations agent assigned to uncover the mystery of

recent underwater volcanic activity and how it is related to changes in the songs of humpback whales. Sounds simple, doesn't it? Try again. This is just the tip of the iceberg. I really appreciated the sudden twists in the plot of this Adventure. Also, Ken has done an excellent job of hiding the "real" objective beneath a web of mystery.

Honorable Mention goes to Chris Cuthill for his work on *Power Search*. In this Adventure you are leading an expedition to find the last remaining sources of uranium. It is vital you succeed, since the Earth has become totally dependent on nuclear energy (the year: 3010).


The realism of this Adventure is such that you must enter actual coordinates (latitude, longitude and altitude) in order to travel during your search. Your success is based on your ability to calculate locations. Chris included several global maps and a scaled ruler for this purpose.

Unfortunately, the requirement of the detailed maps makes this excellent Adventure unfeasible as a candidate for publication. However, it by no means lessens the entertainment or educational value of the game.

Chris is 15 years old and is currently attending Grimsby Secondary School in Ontario, Canada.

Honorable Mention goes to Jeff Johnson, of Orlando, Florida, for *Superspy*. This 32K Adventure is by no means easy. The player must infer several "normal" daily activities throughout the game. Perhaps the most frustrating, yet captivating, aspect of *Superspy* is that the objective is unknown at the start of the game. This one is definitely not for the light-hearted Adventurer.

The winning Adventures represent only a small sampling of the entries we received in The Fourth RAINBOW Adventure Contest. They represent what I see as the "cream of the crop." The winners will be further honored by being published in *The Fourth Rainbow Book of Adventures*, which will be available in the near future.

While I would like to mention each and every Adventure, it would not be possible. And to list some of the "better" entries isn't really fair in my mind. Each Adventure had its own special quality I was drawn to. No one has "lost" — we have all gained. 

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Adventure Contest Winner



CoCo 3
Best of Show
&
Grand Prize



To Overthrow the Controllers

By Bruce K. Bell, O.D.

From the crest of the hill you can see the deserted city ahead. It is hard to imagine that only four years ago the city teemed with human life. But that was before the Controllers came.

Banning all men to rural life — for their own good, of course — the Controllers systematically destroyed all of Earth's cities. This city was one of the last to be eliminated. Industrious as you are, you want to scavenge for artifacts to sell to collectors, an activity tolerated by the ruling race.

You respect the wisdom of the Controllers — after all, they traveled half-way across the galaxy to make all mankind understand that the old way of life, spent in corrupt pursuit of technological advances, threatened the Plan.

Bruce Bell practices optometry in his hometown of Rockmart, Georgia. He spends hours using programs he finds in THE RAINBOW and programming his CoCo for use in his office and at home.

After having put up an initial show of resistance, most people understood that they were better off under the rule of the new masters.

There has been some talk of a resistance group, but you rather doubt it. After all, who would want to revert to a primitive and heretical way of life? Just the same, you are curious to see for one last time the remnants of a civilization you only vaguely remember.

As you search the ruins, you find an odd-looking shuttle barely large enough to hold one person. Looking in, you see an old *magazine* on the seat with the word "RAINBOW" printed on the front. Immediately you recognize this as the technological poison of which your masters have warned you. But, surely, it would not hurt to look — after all, *you* would not succumb to primitive heresy. You reach for the magazine and flip through it. You see that someone or something named Falsoft had established a West Coast branch in this city.

Pressed between the pages is a small booklet — a manual of some sort. At once, you recognize it as an operations manual for the shuttle. Curiosity overtaking you, you climb in for a closer look, and the door accidentally shuts behind you. You become dizzy and your vision grays. Minutes later your senses return . . .

It is clear to you now that the Controllers are able to manipulate the human will and that the shuttle somehow shields you from their influence. You realize you cannot leave the shuttle. And you wonder if there are others who know what you do. This you must find out and, if any way possible, *destroy the Controllers!*

As the sun sets over the bent city, you pore over the shuttle's manual . . .

Looking the shuttle over, you notice all holding tanks are empty. The gun is gone! You must do your best in spite of all odds. Your mission is clear!

Setting Up for Game Play

You need a Color Computer 3 (128K minimum) and a joystick or a mouse. Type in both listings and save them. If you are saving on cassette, save `CONTROL` first and `CNTRL` immediately following. You will need to enter `PCLEAR1` before typing in `CNTRL`.

To load the game on a disk system, just enter `RUN "CONTROL"`. On a tape system, enter `CLOAD "CONTROL"`. After the program has loaded from tape, enter `RUN`. When prompted to press the firebutton, do so and also depress the Play button on the tape recorder. The tape should already be positioned just before the main program, `CNTRL`. This program will automatically be loaded for you. When it has finished, simply enter `RUN` a second time and the game will start.

Either the right or left joystick may be used, but use the same one throughout the game.

Hints

Examine every location and identify every object. This is an advanced Adventure requiring wit and skill to complete. Therefore, save your place often! The object of the Adventure is twofold: trying to destroy the Controllers, and accumulating as much wealth as possible. You'll need it in the aftermath of the Controller's defeat. As much as \$2,101,000 in treasure lies hidden in the landscape of the Adventure.

Should you accidentally press `BREAK` during game play, type `GOSUB 295:HSCREEN2:CONT` to reset.

In this battle you have become a soldier — a soldier of fate and fortune! Good luck — you'll need it!

(Questions or comments regarding this Adventure may be directed to the author at 137 Samanda Circle, Rockmart, Georgia 30153. Please enclose an SASE when requesting a reply.) □

Operations

The ATS-CC5 All Terrain Shuttle is designed for maximum maneuverability over all types of earthen terrain, as well as in water. The ATS-CC5 employs a unique electromagnetic shell that eliminates any threat of being overtaken by the Controllers via thought control.

The various background and tracking control functions of the ATS-CC5 are maintained by the powerful Color Computer 5, which was developed just prior to the original Controller invasion. Operator control of the ATS-CC5 is also carried out through this system.

The main console of the ATS-CC5 allows the single occupant complete control of all shuttle operations. The individual controls are described starting from the upper-left corner and proceeding in a clockwise fashion around the panel.

Digital View Screen (DVS)

The large view screen displays a digitized video image of the forward surroundings exterior to the shuttle. It is important to note that the image you see is a digital representation and therefore caution must be used in placing objects outside the craft. Objects that are similar in color to the exterior background may be difficult to see later.

Command Center

The 10 function buttons (two rows of five) on the right side of the control panel are used to engage the shuttle's inherent commands. Moving the joystick (or mouse) selects the function marked by a small blue light in the upper left-hand corner of the button. The light glows red

when the function is engaged by pressing the firebutton. These buttons are described below.

Examine (magnifying glass) gives you a brief description of the area immediately outside the shuttle.

Lights On/Off (light with rays) toggles the shuttle's lights on and off. A blue light on this button indicates when the lights are on. Note that one unit of power from the battery is expended with each move of the shuttle while the lights are on.

Retrieve/Get (up arrow) transfers joystick control to a small blinking cursor in the DVS. Move the cursor over an object you desire to retrieve and press the firebutton. The object will appear in the holding tanks below. To leave this mode without getting an object, move the cursor to an area of the DVS containing no obtainable object and press the firebutton.

Release/Drop (down arrow) selects the target for release from the craft. When you press this button, you will see a small blue light appear on one of the holding tank monitors in the lower part of the control panel. Move the joystick and press the firebutton and the object will appear in the DVS.

Use (hand with index finger extended) analyzes a target to determine its purpose. Press this button and then select the object in the holding tanks you want to use (as described under *Release*). Use is a multipurpose function and therefore quite powerful. Since the shuttle is controlled by the powerful Color Computer 5, analyzing a target is simple. Therefore, to *USE SANDWICH* will result in the sandwich being eaten. *USE BAT* is synonymous with swinging the bat. *USE GAS* to fill your tanks or *USE*

✓ 40	.....19	170	.....37
70	.....204	195	.....215
105	.....155	225	.....70
125	.....223	END	.....224

Listing 1: CONTROL

```

Ø 'THE CONTROLLERS 1.Ø, "CONTROL
" - BOOT PROGRAM, (C) 1987 BRUCE
  BELL, This program is availabl
  e "as is" and is nonwarranted!
5 CLEAR5ØØ:PCLEAR5:Pmode3,2:WIDT
H32:ATTRØ,Ø:MP=PEEK(188)*256
1Ø PRINT"THE CONTROLLERS 1.Ø","C
OPYRIGHT (C) 1987 BRUCE BELL","C
OCO3 128K",,,,"MONITOR TYPE",,:I
NPUT"1. CMP (TV)  2. RGB ";Q$:Q
=VAL(Q$):IFQ<1ØRQ>2THEN5ELSEPOKE
MP+86,Q-1
15 PRINT:PRINT"LOADING METHOD",,
:INPUT"1. DISK  2. TAPE ";Q$:Q=

```

```

VAL(Q$):IFQ<1ØRQ>2THEN15ELSEPOKE
MP+87,Q-1:PRINT:PRINT"PRESS YOUR
  FIRE BUTTON"
2Ø IFBUTTON(Ø)THENQ=ØELSEIFBUTTO
N(2)THENQ=2ELSE2Ø
25 POKEMP+88,Q:WIDTH4Ø
3Ø PRINT"  While scavenging a w
est coast city  which will be d
estroyed by your masters,the Con
trollers, you find an odd lookin
gshuttle large enough to hold on
ly one  person. Climbing in, th
e door accident- ally shuts behi
nd you. You become dizzy"
35 PRINT"as your vision greys. M
inutes later yoursenses return..
."
4Ø PRINT:PRINT"  It is clear to
you now that the Con- trollers
are able to manipulate the hu- m
an will. Somehow the shuttle mus
t  shield you from this."
45 PRINT:PRINT"  You cannot lea

```

BATTERY to restore your power systems. The USE function is limited only by your imagination.

Identify (question mark) describes an object in the holding tanks. Since all images in the holding tanks are digital images, low relative resolution may make an object unidentifiable by sight alone. Using the power of the CoCo 5, you can select an object in the holding tanks (by pressing the ? switch) and it will be described.

Score (double arrows) displays your current score and assets. The score represents the number of moves you've made from one location to another. Other commands do not add to your score. Of course, the lower your score and the higher your assets, the better you've played.

Map (diamond shape) displays a map of your travels on the screen. In each position you've been, a hexadecimal number from \$1 to \$F appears. Each number represents the exits available from that position. A legend below the map describes this directional code. Your current position blinks on the map. Using your joystick, you may move the line cursor around the map. The location and any objects left in that position (of only the locations you've been) appear below the map. To exit the map, press the firebutton.

Save/Load saves your place. Prepare the tape or disk and answer the prompts, pressing S or L for Save or Load, respectively and T, D, or A for Tape, Disk or Abort, respectively.

Quit (hexagon) allows you to end your travels in the ATS CC5 (i.e., quit the game).

Locomotion

The ATS-CC5 is moved by pressing the large

rocker switch below the command center. The letters N, S, E and W light up, signifying which of the four directions (North, South, East and West) you may go. Move the blue indicator to the desired direction and press the firebutton.

Fuel and Battery Indicators

One unit of fuel is used with each move. The ATS-CC5's battery is used to power the exterior lights as well as its laser gun and force field. Depending on the laser intensity, the gun uses one or two units of power with each firing. The laser's intensity is automatically set and may not be adjusted manually. The force field (engaged automatically) uses one unit of power for each hit it receives, and one unit of power is expended with each move while the shuttle's lights are on.

Holding Tanks

There are five holding tanks for objects brought into the ATS-CC5. Digital images appear on the miniature DVSs below the screen. Indicator lights glow blue when selected and red when engaged (firebutton is pushed). The smaller button to the right of Tank 5 is for exiting without selecting one of the monitors.

There is a separate holding tank for any treasures you may find. These are not displayed on the control panel. Hence, you may retrieve treasure even when your holding tanks are full.

Laser Gun

The laser gun may be held in any of the five holding tanks. When there is danger, the gun is automatically engaged. It may also be engaged manually with a USE GUN command.

ve the shuttle! Are there others who know what you do? Thesethings you must find out and if any way possible - destroy..."

```
50 FORK=MP TO MP+82:READA$:POKEK
,VAL("&H"+A$):NEXT
55 DATA10,8E,DD,DD,86,70,B7,FF,A
1,4C,B7,FF,A2,8E,5F,BF,AF,8D,0,1
B,8E,24,64,8D,3,16,0,2A,5F,10,AF
,81,5C,C1,3C,2D,F8,30,88,28,AC,8
D
60 DATA0,3,2D,EE,39,0,0,10,8E,22
,22,86,72,B7,FF,A2,8E,5E,60,AF,8
D,FF,EE,8E,46,A4,8D,D6,86,79,B7,
FF,A1,4C,B7,FF,A2,B7,FF,A2,39
65 FORK=MP+91 TO MP+150:READA$:V
=VAL("&H"+A$):POKEK,V:POKEK+60,V
:NEXT
70 DATA86,70,B7,FF,A1,4C,B7,FF,A
2,CE,0,A,8E,24,DB,10,8E,0,77,E6,
84,30,1F,A6,84,A7,1,31,3F,26,F6,
E7,84,30,89,1,17,8C,5F,BF,2D,E5-
33,5F,11,83,0,0,26,DA,86,79,B7,F
F,A1,4C,B7,FF,A2,39
75 POKEMP+165,&H64:POKEMP+173,1:
POKEMP+177,&H1F:POKEMP+185,&H88:
POKEMP+186,&H29:POKEMP+187,&H12
80 FORK=MP+211 TO MP+251:READA$:
POKEK,VAL("&H"+A$):NEXT
85 DATA86,70,B7,FF,A2,8E,44,DB,E
6,84,10,8E,0,77,30,1F,A6,84,A7,1
,31,3F,26,F6,E7,84,30,89,1,17,8C
,52,9B,2D,E5,86,7A,B7,FF,A2,39
90 FORK=MP+252 TO MP+650STEP2:RE
ADR,A$:POKEK,R:POKEK+1,VAL("&H"+
A$):NEXT
95 DATA29,22,29,23,29,23,29,23,2
9,27,29,23,29,23,29,23,29,23,29,
21,2,6,2,3,2,3,2,3,2,3,2,3,2
,3,5,5,6,21,30,2C,30,27,30,2D,27
,16,28,3,27,15,1,22,3,27,1,23,1,
25,1,2A,1,23,1,23,1,23,1,23,1,25
,2,6,2,3,7,9,8,21
100 DATA30,2A,30,2B,31,29,27,1A,
27,17,32,1F,26,11,4,2A,3,23,1,2B
,1,63,1,23,1,27,1,23,1,23,1,2D,2
,E,2,3,9,1,10,21,25,16,25,13,25,
13,25,13,32,1B,32,19,26,16,20,17
,20,17,20,17,20,17,20,15,1,2A,1,
23,1,23,1,29,2,E,2,7,2,7,2,5
105 DATA25,1E,25,13,20,13,23,17,
24,7,23,15,15,A,15,B,15,B,15,B,1
5,B,14,1F,14,17,14,17,12,17,12,1
7,11,1F,11,1F,11,1F,11,1D,25,1A,
25,13,20,13,23,1B,23,1B,23,1D,16
,16,16,17,16,17,16,17,16,15,14,1
E,14,1F,14,1F,12,1F,12,1F,11,1F,
11,1F,11,1F,11,1D
110 DATA21,16,21,17,21,17,21,13,
21,13,22,11,16,1E,16,1B,16,1B,16
,1B,16,19,14,1E,14,1F,14,1F,12,1
```

```
F,13,0,12,1F,12,1F,12,1F,12,1D,2
6,1A,20,1B,20,1B,20,13,20,13,19,
15,17,18,18,23,18,23,18,23,18,25
,14,1E,14,1F,14,1F,12,1F,12,1F,1
3,0,12,1F,12,1F,12,1D
115 DATA19,16,19,17,19,17,19,13,
19,13,19,19,18,26,18,25,18,26,18
,27,18,2D,14,1E,14,1F,14,1F,14,1
F,14,1F,14,1F,14,1F,14,1F,14,1D,
19,1A,19,1B,19,1B,19,13,19,13,19
,13,18,2B,18,2B,18,29,18,2A,18,2
9,14,1A,14,1B,14,1B,14,1B,14,1B,
14,1B,14,1B,33,1B,14,19
120 IFPEEK(MP+86)THENPALETTERGB:
PALETTE5,56:PALETTE7,0:PALETTE13
,56:PALETTE14,7ELSEPALETTECMP:PA
LETTE5,32:PALETTE7,0:PALETTE13,3
2:PALETTE14,16
125 PCLS2:DRAW"BM8,136C1U88R240C
8D88L240BE8R4U4BHC1L4D4BU68U4R4B
FC8D4L4BR222R4U4BHC1L4D4BD68U4R4
BFC8D4L4BM30,80":A=MP+652
130 GOSUB250:GOSUB135:GOSUB255:G
OSUB135:GOTO145
135 FORK=1TO197:POKEA,ASC(MID$(A
$,K,1)):A=A+1:IFMID$(A$,K,1)="C"
THENIFMID$(A$,K+1,1)="1"THENK=K+
1:POKEA,52:A=A+1
140 NEXT:DRAWA$:RETURN
145 A$="Lonnie, Marty, and Tony
left seven days ago to test the
shuttle you're in. We haven't
heard from them since. This
building is shielded as is your
shuttle and we can't leave. See
if you can find them!"+CHR$(13)+
"J. KAPFHAMMER"
150 A=MP+1046:FORK=1TO219:POKEA,
ASC(MID$(A$,K,1)):A=A+1:NEXT
155 FORK=MP+1265TOMP+1534:READA$:
POKEK,VAL("&H"+A$):NEXT
160 DATA2,79,20,64,69,73,63,6F,
6E,6E,65,63,74,69,6E,67,20,74,68
,65,69,72,20,70,6F,77,65,72,20,7
3,75,70,70,6C,79,20,79,6F,75,20,
68,61,76,65,20,64,65,73,74,72,6F
,79,65,64
165 DATA20,74,68,65,20,43,4F,4E,
54,52,4F,4C,4C,45,52,53,21,20,54
,68,65,20,43,6F,6E,2D,74,72,6F,6
C,6C,65,72,73,20,61,72,65,20,61,
20,72,61,63,65,20,6F,66,20,6D,61
,63,68,69
170 DATA6E,65,73,20,77,68,6F,20,
66,65,61,72,74,68,65,20,63,6F,6D
,70,75,74,65,72,73,20,73,65,6E,7
4,69,65,6E,74,20,62,65,69,6E,67,
73,20,64,65,76,69,73,65,20,73,6F
,D,74,68
175 DATA65,79,20,65,6E,73,6C,61,
76,65,20,74,68,65,6D,20,61,6E,64
```



```

,20,64,65,73,74,72,6F,79,20,74,6
8,65,69,72,20,63,6F,6D,2D,70,75,
74,65,72,73,2E,20,41,73,20,75,73
,75,61,6C
180 DATA20,74,68,65,20,43,4F,43,
4F,20,77,61,73,27,6E,74,20,74,61
,6B,65,6E,D,73,65,72,69,6F,75,73
,6C,79,2D,20,62,75,74,20,74,6F,2
0,74,68,65,69,72,20,64,65,6D,69,
73,65,21
185 WIDTH32:SCREEN1,1:FORK=30TO0
STEP-5:PLAY"L25501;V=K;1;2;3;6;4
;8;9;11;3;2;12;3;2;1;V30":NEXT:P
OKE65497,0
190 HSCREEN2:HSCREEN0:POKE&HE6,2
:POKE&HE6C6,18:POKE&HE6C7,18:HCO
LOR0,0:HCLS14
195 HDRAW"BM0,108S4C3U108R255D10
8L255EU106R253D106L253E C8U104R2
51GL249D102EU100R247 C13D100L247
GR249U102ED104L251"
200 FORX=287TO317STEP30:FORY=2TO
106STEP23:HDRAW"BM=X;=Y;C8D20L2
5ER23U18 C13L23D17R22U17 BEC4L24
D19C13":HPAINT(X-4,Y+4),13,13:NE
XTY,X
205 HDRAW"BM271,13C4NG6U8R10 C8D
8L9G5 BR29BU6C4NF6E6C8BFF2D6NG2B
R3F2C4BUH2BU3R4BDC8L4BU3E2BUC4G2

```

```

BD20BL9NR10D7L2F7 C8E7L2U7 BL35
F7L2D7L10 C4U7L2E7 BD36BL6H2U4E2
R9U4ER2 C8FD10G2BU7BL2D2BL4U2BL4
D2
210 HDRAW"BR32BD6R2U2BU2NL2U2R8U
8 C4L12D4 C8R2U2R8 C4D4L8D3BD3ND
R BD12BRC8F6G6C4H6E6BFBDD8BL2C8U
8 BL34BU2F6G6BR6E6H6C4D12BL6U12
BD23BRND12R12BD4L2BL2BGD2L2 C8U2
R2BR2BEU2R2U2BD4D8L12 BR33BUR4E4
U3H4C4L4G4D3F3
215 HDRAW"BM266,160C13U42R48D42L
48 C4GU44R50 C8D44L50":HPAINT(27
2,155),13,13:HDRAW"BM290,140C4LU
RBERBFRBD C8LBGLBD8H10E10 C4F10G
10":HPRINT(36,15),"N":HPRINT(34,
17),"W":HPRINT(38,17),"E":HPRINT
(36,19),"S"
220 HDRAW"BM234,166C4L14D24EU22R
12C8D22L12GR14U24BG2C13D20L10U20
R10":HPAINT(230,170),13,13
225 HDRAW"BM245,176C13R8HL6UR6UL
6UR6UL6U4R6D4R2D2FREU4LFH2 BM245
,188R10UL10UR10UL10UR10UL10ERBR6
RC8BD3L2BL5NUNRNDNL BM317,166C4D
10L55C8U10R55BGC13D8L53U8R53BD14
D8L53U8R53BEC4D10L55C8U10R55":HP
AINT(310,170),8,13:HPAINT(310,18
3),8,13

```

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R.A.D. Products Presents TEXTFORM

Finally, a versatile text formatter is available for the Color Computer. TEXTFORM is compatible with all models with at least 64K, even the Color Computer III. This machine language program will format ASCII text files into two column pages quickly and easily. Text may be left unmodified, or simply insert special formatter commands for added control. TEXTFORM is a versatile enhancement to any word processing system whether you are a casual or professional user.

Software supports:

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- Most popular printers
- Adjustable format parameters
- Columnar data
- Multiple page titles
- Optional page numbering
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- Disk drive
- Printer

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```

230 FORX=2TO178STEP44:HDRAW"BM=X
; ,164C4D26RU26R34D26LNU26L34BE C
13R32U24GD22L30 C8U23R32GL30D21
C8BR34BU23D28L34C4":FORC=0TO4:HC
OLORC,0:HLINEX+5+C*5,167)-(X+10
+C*5,186),PSET,BF:NEXTC,X
235 HDRAW"BM2,112C1R254D48L254U4
9R255D50L256U10NR255U40":HPAINT(
12,150),2,1:HCOLOR13,2:HPRINT(6,
19),"/// COLOR COMPUTER 5"
240 HDRAW"BM30,40S4":GOSUB250:HD
RAWA$:GOSUB255:HDRAWA$:HSCREEN2:
PMODE0,1:PCLEAR1
245 POKE65496,0:IFPEEK(PEEK(188)
*256+87)THENWIDTH40:PRINT:PRINT"
Type RUN when you see the OK.":C

```

```

LOAD"CNTRL"ELSERUN"CNTRL",R
250 A$="C1U6C8L2C1U4R8C8D4L2D6L4
BR8R4U4R2C1D4C8R4U10C1L4D4L2C8U4
C1L4D9BDBR12U10R8C8D2L4D2C1R4C8D
2L4D2C1R4C8D2L8BG22S8C1U10R8C8D4
L5D2C1R5C8D4L8BR9R8U10C1L8D10BR9
U10R3C8F2C1U2R3C8D10L3C1H2C8D2L3
BR10R6U6RU4C1":RETURN
255 A$="L8D4C8RC1D6BR8U10R8C8D8L
2F2L3C1H2C8D2L3BR9R8U10C1L8D10BR
9U10R6C8D4C1R2C8D6L8BR9R8U6C1L2C
8U4C1L6D10BR9U10R8C8D2L4DC1R4C8D
4L4DC1R4C8D2L8BR9R3U2C1F2C8R3H2R
2U8C1L8D10BR9U2R4UC8L4C1U7R8C8D2
L4DC1R4C8D7L8":RETURN

```

55	55	540	141	900	209
125	3	570	209	945	55
170	243	610	234	965	109
205	200	650	67	1005	111
270	79	690	83	1025	47
300	206	730	38	1060	205
340	82	760	253	1080	223
365	60	790	186	1140	223
410	196	830	139	1200	79
425	140	850	75	1230	104
475	168	880	33	END	103
505	73				

Listing 2: CNTRL

```

0 'THE CONTROLLERS 1.0, "CNTRL"
- MAIN PROGRAM, (C) 1987 BRUCE B
ELL, This program is available "
as is" and is nonwarranted!
5 GOSUB295:DIMR$(34),O$(29),A(20
0),R(200),D(3),O(35)
10 POKE65497,0:HSCREEN2:F1=PEEK(
188)*256:F2=F1+49:M1=F1+91:M2=F1
+151:M3=F1+211:P1=F1+2:P2=F1+3:E
XECF2:HCOLOR4,0:HPRINT(1,16),"On
e moment please":FORA=0TO4:GOSUB
230:NEXT:GOSUB160:GOSUB1210
15 V(5)=48:V(6)=48
20 LO=1:L=1:GOSUB200:GOTO440
25 D=0:IF(A(R)AND32)=32THENIFL=0
THEND=1:GOTO1105ELSEIFL=1ANDV(6)
<1THEND=1:GOTO1105
30 IFPR<>R THENONR(R)GOSUB710,72
0,710,1060,720,805,720,830,720,8
40,755,770,1050,790,855,865,365,
885,895,925,975,975,990,955,925,
925,945,955,1005,1015,1040,330,7
90,770
35 IF(A(R)AND128)=128GOSUB150
40 FORO=0TO35:IFO(O)=R GOSUB175:
NEXTELSENEXT

```

```

45 FORK=0TO3:IF(D(K)ANDA(R))=D(K)
)THENHCOLOR4,0ELSEHCOLOR13,0
50 ONK GOTO55,60,65:HPRINT(36,15
),"N":GOTO70
55 HPRINT(36,19),"S":GOTO70
60 HPRINT(38,17),"E":GOTO70
65 HPRINT(34,17),"W"
70 NEXT
75 R$=R$(R)
80 GOSUB215
85 IF(A(R)AND16)=16THENM=1ELSEM=
0
90 IFLZ=1THENLZ=0:IF(A(R)AND32)=
32THENL=1:LO=1:GOTO440
95 CD=0
100 HDRAW"BM=JX; ,=JY;C2RDLU"
105 IFM THENEXECM3:IFR=147THENC=
0:FORK=9TO11:A=((A+1)AND3):C=7+A
:PALETTEK,C:NEXT
110 IFBUTTON(BU)THEN130ELSEH=JOY
STK(0):H=JOYSTK(JH):V=JOYSTK(JV)
:IFH1=H ANDV1=V THEN105ELSEH1=H:
V1=V
115 POKE65497,0:GOSUB170
120 IFCD=0THENIFV<40THENJX=INT(H
/32)*30+264:JY=INT(V/8)*23+4:GOT
0100ELSEIFV<48THENJX=285:JY=122:
GOTO100ELSEIFV>55THENJX=285:JY=1
54:GOTO100ELSEJX=INT(H/32)*41+26
9:JY=139:GOTO100
125 JX=INT(H/10.7)*44+33:JY=188:
IFJX>209THENJX=230:JY=187:GOTO10
0ELSE100
130 IFR=147GOSUB160
135 HDRAW"BM=JX; ,=JY;C3RDLU":PLA
Y"L200O3ABC":IFCD=0THENC=INT(H/
32)+INT(V/8)*2+1:XJ=JX:YJ=JY:ONC
D GOTO405,440,445,485,490,620,62
5,630,675,700,300,300,305,310,31
5,315:GOTO95
140 A=INT(H/10.7):RETURN
145 GOSUB170:JX=XJ:JY=YJ:CD=0:IF

```



```

W THENW=0:GOTO45ELSE115
150 IFR=126THENHCOLOR11,0:HLINE(
83,38)-(151,80),PSET,BF:RETURNEL
SEIFR(R)=15THENHCOLOR13,0:HLINE(
50,7)-(100,60),PSET,BF:RETURNELS
EHDRAW"BM24,28C8E10F8E8F10R14G14
L8G8H8L6H6E4H4":HPAINT(34,34),8,
8:RETURN:'BREAK WINDOW
155 HCOLOR10,8:HLINE(110,14)-(15
0,70),PSET,BF:HDRAW"BM127,18C4L1
1D25C8R11U25BR18D25L11C4U25R11BD
31L11D16C8R11U16BL18D16L11C4U16R
11BL12BUH2E2C8BM151,14C8D56L40GR
42U58C4L42D58EU56R40":RETURN:'DO
OR
160 IFPEEK(F1+86)THENPALETTERGB:
PALETTE5,22:PALETTE9,32:PALETTE1
0,53:PALETTE11,8:PALETTE12,25:PA
LETTE13,56:PALETTE14,7:PALETTE15
,20ELSEPALETTECMP:PALETTE5,33:PA
LETTE9,5:PALETTE10,20:PALETTE11,
13:PALETTE12,45:PALETTE13,32:PAL
ETTE14,16:PALETTE15,1
165 RETURN
170 HDRAW"BM=JX;=JY;C13RDLU":RE
TURN:'INDICATORS OFF
175 IFD THENRETURNELSEOG=0:IFO<9
THENOX=8+O*26:OY=80ELSEIFO<15THE
NOX=8+(O-9)*26:OY=100ELSEIFO<23T

```

```

HENOX=164:OY=100:OG=15ELSEIFO<30
THENOX=190:OY=100:OG=16ELSEOX=21
6:OY=100:OG=17
180 IFHP THENHPUT(OX,OY)-(OX+26,
OY-23),OG+2,PSET:HP=0:RETURNELSE
HGET(OX,OY)-(OX+26,OY-23),OG+2
185 HDRAW"BM=OX;=OY;":ONOG+1GOS
UB1135,1120,1160,1115,1155,1195,
1200,1145,1125,1175,1130,1180,11
40,1185,1170,1165,1150,1190:RETU
RN:'DROP
190 FORO=0TO35:IFO(O)=PR THENHP=
1:GOSUB175
195 NEXT:RETURN:'PLACE OBJECT
200 HDRAW"BM266,171C8R48DL48UC6R
=V(5);DL=V(5);":V(5)=V(5)-1:IFV(
5)<1THENV(5)=0:GOSUB215:HPRINT(1
,17),"OUT OF GAS!":RETURNELSEIFL
=0THENRETURN
205 HDRAW"BM266,185C8R48DL48UC7R
=V(6);DL=V(6);":V(6)=V(6)-1:IFV(
6)<1THENV(6)=0:GOSUB215:HPRINT(1
,17),"BATTERY DEAD!":LZ=1:RETURN
ELSERETURN
210 C=0:FORX=0TO30STEP5:C=C+1:FO
RY=1TO5:HCIRCLE(128,62),X+Y,C,1,
.5,1:NEXTY,X:RETURN
215 EXECF2:HCOLOR4,0:HPRINT(1,15
),"LOCATION: "+R$:RETURN:'CLEAR

```



CoCo Cat
Says
Drugs Are
NOT
User-Friendly



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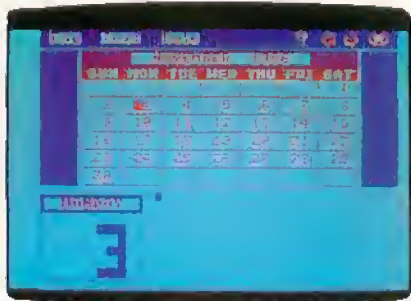
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MESSAGE

```

220 GOSUB215:HPRINT(1,17),"Select
desired object":RETURN:'MONITOR
MESSAGE
225 GOSUB215:HPRINT(1,17),"Abort
Command":SOUND50,1:RETURN:'ABORT
MESSAGE
230 FORC=0TO4:HCOLORC,0:B=A*44+7
+C*5:HLIN(B,167)-(B+5,186),PSET
,BF:NEXT:RETURN:CLEAR MONITORS
235 PRINT:PRINT:PRINT"Press Fire
Button to continue..."
240 IFBUTTON(BU)THENHSCREEN2:RET
URNELSE240
245 WIDTH40:ATTR0,0:CLS:PRINT:PR
INT:RETURN:'PREPARE TEXT SCREEN
250 V(6)=1:GOSUB205:HPRINT(1,18)
,"NO POWER FOR THE GUN!":RETURN
255 OX=7+A*44:OY=186:HCOLOR13,0:
HLIN(OX,OY)-(OX+25,167),PSET,BF
:GOSUB185:RETURN:PREPARE FOR CAR
GO
260 HPRINT(1,17),"SCORE="+STR$(V
(7))+ " ASSETS= $" +MID$(STR$(V(8
)),2):RETURN
265 FORK=1TO15:GOSUB160:NEXT:GOS
UB170:RETURN
270 GOSUB285:GOSUB235:HSCREEN2:P
OKE65496,0:FORK=30TO0STEP-5:PLAY
"L25501;V=K;1;2;3;6;4;8;9;11;3;2
;12;3;2;1;V15;03":NEXT:IFO=6GOSU
B210:HPRINT(7,2),"COCO LIVES FOR
EVER!"
275 EXECF2:HCOLOR4,0:HPRINT(1,15)
,"Play again (Y/N)?:GOSUB260
280 Q$=INKEY$:IFQ$="N"THENWIDTH4
0:CLS:PRINT"BYE! BYE!":ENDELSEIF
Q$="Y"THEN10 ELSE280
285 POKE&HE6,2:POKEP1,221:POKEP2
,221:EXECF1:HDRAW"BM30,40":A=F1+
652:FORX=1TO2:A$="":FORK=1TO197:
A$=A$+CHR$(PEEK(A)):A=A+1:NEXT:H
DRAWA$:NEXT:HDRAW"S4":RETURN
290 FORK=1TO15:GOSUB160:NEXT:GOS
UB245:FORK=F1+1265TOF1+1534:PRIN
TCHR$(PEEK(K)):NEXT:PRINT:PRINT
"You have been given a lifetime
subscrip-tion to The RAINBOW and
even your own column!":GOTO27
0
295 HBUFF1,15:FORK=2TO19:HBUFFK,
400:NEXT:RETURN:'SET BUFFERS
300 CD=0:IFV(5)=0ORD=1OR(8ANDA(R
))<>8THEN115ELSEPR=R:R=R-20:GOTO
320
305 CD=0:IFV(5)=0ORD=1OR(1ANDA(R
))<>1THEN115ELSEPR=R:R=R-1:GOTO3
25
310 CD=0:IFV(5)=0ORD=1OR(2ANDA(R
))<>2THEN115ELSEPR=R:R=R+1:GOTO3
20

```

```

315 CD=0:IFV(5)=0ORD=1OR(4ANDA(R
))<>4THEN115ELSEPR=R:R=R+20:GOTO
325
320 V(7)=V(7)+1:A(R)=(A(R)OR64):
GOSUB200:IFR(PR)=R(R)GOSUB190:EX
ECM2:GOSUB170:IFR(R)=32THEN25ELS
E40ELSEGOSUB170:GOTO25
325 V(7)=V(7)+1:A(R)=(A(R)OR64):
GOSUB200:IFR(PR)=R(R)GOSUB190:EX
ECM1:GOSUB170:IFR(R)=32THEN25ELS
E40ELSEGOSUB170:GOTO25
330 POKEP1,0:POKEP2,0:EXECF1:HDR
AW"BM8,39C14R239":HPAINT(10,10),
12,14:S=6:R$="UNDER ATTACK!":GOS
UB215:IFO(1) THENA$="NO GUN?!"EL
SEA$="Guns Engaged!"
335 HPRINT(1,17),A$:FORY=40TO95S
TEP6:HDRAW"XCL$;BM8,=Y;C9R239BD2
C10L239BD2C11R239":NEXT:C=9:X=20
:H=RND(218):HGET(H,39)-(H+22,31)
,4:H=H+8:HDRAW"BM=H;,39XFSS$":H=
H-8
340 FORK=9TO11:PALETTEK,0:PALETT
EC,18:C=K:HPUT(H,39)-(H+22,31),4
,PSET:HDRAW"BM=X;,102C14RDL":IFS
<1THENK=12:NEXT:GOSUB160:RETURNE
LSEH=RND(16)-8+H:IFH>225THENH=10
ELSEIFH<10THENH=220
345 IFV(6)<1GOSUB265:GOSUB160:NE
XT:GOSUB245:PRINT"Your shields h
ave failed and your craft destro
yed.. And so were you!":GOTO270E
LSEHGET(H,39)-(H+22,31),4:H=H+8:
HDRAW"BM=H;,39XFSS$":H=H-8:IFRND
(10)=1THENA=1:B=H+12:GOSUB360:GO
SUB205
350 IFO(1)THENNEXT:GOTO340ELSEIF
BUTTON(BU)=0THENY=JOYSTK(0):X=JO
YSTK(JH)*3.5+16:HDRAW"BM=X;,102C
7RDL":NEXT:GOTO340
355 V=HPOINT(X,39):A=3:B=X:GOSUB
360:GOSUB205:IFV=13THENS=S-1:HPU
T(H,39)-(H+22,31),4,NOT:PLAY"ADG
FBCDEFGAGC":HPUT(H,39)-(H+22,31)
,4,PSET:H=RND(218):GOTO345ELSEN
EXT:GOTO340
360 HGET(B,100)-(B+1,39),3:HDRAW
"BM=B;,100C=A;U61RD61":PLAY"L255
GEDCB":HPUT(B,100)-(B+1,39),3,PS
ET:RETURN
365 POKEP1,136:POKEP2,136:EXECF1
:HCOLOR9,0:HLIN(64,38)-(192,48)
,PSET,BF:HCOLOR10,0:HLIN(24,54)
-(120,64),PSET,BF:HCOLOR11,0:HLI
NE(136,54)-(232,64),PSET,BF
370 HCOLOR4,0:HPRINT(9,5),"SAUCE
R ATTACK!":HPRINT(4,7),"ONLY $1.
00":HPRINT(18,7),"ONLY $1.00":FO
RX=15TO225STEP38:Y=X+19:HDRAW"BM
=X;,17XFSS$;BM=Y;,28XFSS$":NEXT:S
=12:RETURN

```



```

375 GOSUB215:HPRINT(1,16),"Guns
Engaged!":HPRINT(1,17),"Press an
y key to disengage."
380 IFM THENEXECM3
385 IFBUTTON(BU)=0THENY=JOYSTK(0
):HDRAW"BM=X;,102C14RDLCA":IFS<1
ORINKEY$<>"THENRETURNELSEX=JOYS
TK(JH)*3.25+24:HDRAW"BM=X;,102C7
RDL":GOTO380
390 V(6)=V(6)-2:IFV(6)<3GOSUB250
:GOTO380ELSEGOSUB205
395 V=HPOINT(X,28):IFV=13THENY=2
8ELSEV=HPOINT(X,17):Y=17
400 HGET(X,100)-(X+1,Y),3:HDRAW"
BM=X;,100C3M=X;,=Y;C8":PLAY"L255
GEDCBA":HPUT(X,100)-(X+1,Y),3,PS
ET:IFV=13ANDR=147THENHLINE(X-14,
Y)-(X+14,Y-8),PSET,BF:PLAY"ABEF"
:S=S-1:GOTO380ELSE380
405 CD=0:GOSUB215:A$="Nothing sp
ecial":IFR=1THENA$="This door is
locked!"ELSEIFR(R)=29THENA$="Ve
ry clean!"ELSEIFR(R)=30THENA$="V
ery noisy!"ELSEIFR(R)=23ORR(R)=2
7THENA$="It's hot out here"ELSEI
FR(R)=25THENA$="Flying Saucers!"
410 IFR(R)=26THENA$="A lump on t
he ground"ELSEIFR(R)=19THENA$="W
ho would bury computers"ELSEIFR(

```

```

R)=18THENA$="Graffiti on the wal
ls"ELSEIFR=147THENA$="Practice w
ould help you"ELSEIFR(R)=16THENA
$="A shooting gallery ahead"
415 IFR(R)=15THENA$="I hear dogs
barking!"ELSEIFR(R)=14THENA$="L
ooks inviting"ELSEIFR(R)=33ORR(R
)=34THENA$="A lump in the sand"EL
SEIFR(R)=12THENA$="The fish are
frightened"ELSEIFR(R)=11THENA$=
"Hole"+STR$(RND(18))ELSEIFR(R)=2
THENA$="Looks deserted."
420 IFR=59THENA$="Bullet-proof w
indows"ELSEIFR=19ORR=39THENA$="D
oor is locked"ELSEIFR(R)=3THENA$
="Door is open"ELSEIFR=48THENA$=
"Something smells good!"ELSEIFR(
R)=1THENA$="Dark and dingy"ELSEI
FR=126ORR=85THENA$="Identificati
on required!"
425 IFR(R)=13THENA$="Looks hungr
y!"ELSEIFR=20THENA$="It's your k
ind of place"ELSEIFR=40THENA$="E
veryone has moved out"ELSEIFR=60
THENA$="Lotsa guns!"
430 IFD THENA$="SPOOKY!"
435 HPRINT(1,17),A$:GOTO115
440 CD=0:L=1AND(L+1):C=13-L:HRA
W"BM314,4C=C;RDLU":GOSUB215:HPRI

```

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```

NT(1,17),"Lights "+MID$("ON OFF"
,(C-12)*3+1,3):IF(A(R)AND32)=0AND
DLO=0THEN115ELSELO=0:GOTO25
445 CD=0:X=10:Y=X:IFBUTTON(BU)TH
EN445ELSEGOSUB215:HPRINT(1,17),"
Receive Cargo"
450 IFM THENEXECM3
455 IFBUTTON(BU)=0THENHGET(X,Y)-
(X+4,Y+4),1:HPUT(X,Y)-(X+4,Y+4),
1,PRESET:HPUT(X,Y)-(X+4,Y+4),1,P
SET:X=JOYSTK(0):X=JOYSTK(JH)*3.7
+8:Y=JOYSTK(JV)*1.4+10:GOTO450
460 A=5:FORK=0TO4:IFV(K)=-1THENA
=K:NEXTELSENEXT
465 O=INT((X-8)/26)+INT(Y/81)*9:
OG=O:IFO=15THENFORK=15TO22:IFO(K
)=R THENO=K:NEXTELSENEXT ELSEIFO
=16THENFORK=23TO29:IFO(K)=R THEN
O=K:NEXTELSENEXT ELSEIFO=17THENF
ORK=30TO35:IFO(K)=R THENO=K:NEXT
ELSENEXT
470 IFY<56ORO(O)<>R GOSUB225:GOT
O115 ELSEIFO<30ANDA=5THENA$="Hol
ding Tanks Full":GOTO480
475 HP=1:GOSUB175:IFO=6GOTO290EL
SEA$="Cargo Secured":IFO<30THENO
X=7+A*44:OY=186:HCOLOR13,0:HLINE
(OX,OY)-(OX+25,167),PSET,BF:HP=0
:GOSUB185:V(A)=O:O(O)=0 ELSEO(O)
=0:V(8)=V(8)+350000:GOTO25
480 GOSUB215:HPRINT(1,17),A$:GOT
O115
485 IFBUTTON(BU)THEN485ELSEGOSUB
220:GOSUB125:IFA=5GOSUB225:GOTO1
45ELSEIFV(A)=-1THEN485ELSEGOSUB2
30:O=V(A):V(A)=-1:O(O)=R:GOSUB17
5:GOSUB215:HPRINT(1,17),O$(O)+"
Released":GOTO145
490 IFBUTTON(BU)THEN490ELSEGOSUB
220:GOSUB125:IFA=5GOSUB225:GOTO1
45ELSEIFV(A)=-1THEN490ELSEGOSUB2
15
495 A$=" ":CD=0:ONV(A)+1GOTO500,
505,510,510,525,525,0,530,540,55
5,570,575,585,600,605:GOTO610
500 GOSUB265:GOSUB245:PRINT"The
food was spoiled and Botulism ha
s ended your adventure.":GOTO2
70
505 IFR=147THENA$="NO PAY - NO P
LAY!":GOTO615ELSES=1:GOSUB375:S=
0:IFR(R)=13GOSUB265:GOSUB245:PRI
NT"While your aim was true, ther
e were too many of them. Your ad
venture is over.":GOTO270ELSEA$=
"That was fun!":GOTO615
510 IFR=19ORR=39ORR=49ORR=28ORR=
85ORR=25THENA(R)=(A(R)OR128):W=1
:GOSUB150ELSEIFV(A)=3THENA$="You
"+MID$("SlicedHooked",RND(2)*6-
5,6):GOTO615ELSEA$="Whew, what a

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swing!":GOTO615
515 IFR=19ORR=39THENA(R)=(A(R)OR
2):GOTO615ELSEIFR=25THENA(R)=(A(
R)OR11):GOTO615
520 IFR=85GOSUB265:GOSUB245:PRIN
T"The building was shielded from
the Con- trollers influence. Yo
u have compromised the shield and
for you this adventure is over!":
GOTO270
525 O(V(A))=0:GOSUB245:PRINT"Tha
t was delicious... But there is
some-thing hard in it!":PRINT"It
's a gold nugget worth $500!":GO
SUB235:GOSUB230:O(V(A))=0:V(A)=-
1:V(8)=V(8)+500:GOTO615
530 IFR(R)=13THENR(R)=34:A(R)=(A
(R)OR31):GOSUB245:PRINT"You inju
red the shark causing him to
bleed, which attracted other sha
rks who devoured the attacking s
hark while you escaped!":GOSUB2
35:GOSUB770:W=1:GOTO145
535 A$="A dentist is needed":GOT
O615
540 IFR(R)<>15THENA$="Where's th
e wire?!":GOTO615
545 HPRINT(36,19),"S":GOSUB150:I
FO(0)=R OR V(9)=1THENO(0)=0:V(9)
=1:A(R)=(A(R)OR132):A(R+20)=(A(R
+20)OR8):GOSUB245:PRINT"Guard do
gs went for the food, letting
you pass.":GOSUB235:HP=1:O=0:GOS
UB175:GOTO615
550 GOSUB265:GOSUB245:PRINT"Pit
Bull guard dogs attacked and hav
e ended your adventure!":GOTO2
70
555 IFR(R)=34THENR(R)=12ELSEIFR(
R)=33THENR(R)=14ELSEIFR(R)=26THE
NR(R)=20ELSEIFR(R)=19THENA$="HER
E?! Are you nuts?!":GOTO615ELSEA
$="Don't break your shovel!":GOT
O615
560 FORK=28TO33:IFO(K)=0THENO=K:
NEXTELSENEXT
565 O(O)=R:GOSUB175:A$="Buried t
reasure = $350,000!":GOTO615
570 IFR<>59THENA$="It doesn't wo
rk":GOTO615ELSEA(R)=(A(R)OR2):A$
="It worked! You may pass.":HPRI
NT(38,17),"E":GOTO615
575 IFR=126THENA(R)=(A(R)OR136):
HPRINT(36,15),"N":HCOLOR11,0:HLI
NE(83,38)-(151,80),PSET,BF:A$="T
he gate opens":GOTO615ELSEIFR=85
GOSUB245:PRINT"A MESSAGE APPEARS
ON THE WALL MONITOR...":FORK=FL
+1046TOFL+1264:PRINTCHR$(PEEK(K
)):NEXT:GOSUB235:GOTO615
580 A$="Nobody wants to see it":

```


GOTO615

585 IFR<>147THENA\$="I'd hang on to that dollar":GOTO615ELSEIFO(1) THENA\$="NO GUN- NO PLAY!":GOTO 615

590 GOSUB230:O(12)=126+RND(5):V(A)=-1:GOSUB375

595 GOSUB160:IFS<1THENA\$="Another passage is revealed!":A(R)=(A(R)OR2):HPRINT(38,17),"E":GOTO615 ELSEGOSUB225:GOTO145

600 IFR<>1THENA\$="It has no effect":GOTO615ELSEA\$="It works! The door is open!":A(R)=(A(R)OR4):HPRINT(36,19),"S":GOTO615

605 GOSUB245:PRINT"THE LETTER IS SMUDGED! IT SAYS...":PRINT:PRINT" I have been captured by the Control- lers. I have learned that they are only m c n s. Discard the power to defeat them!" TAB(60)"M. Goodman...":GOSUB235:GOTO615

610 IFV(A)<23THENA\$="Fuel tank re-filled":V(A)=-1:V(5)=48:GOSUB230:GOSUB200ELSEA\$="Battery re-charged":V(A)=-1:V(6)=48:GOSUB230:GOSUB205

615 GOSUB215:HPRINT(1,17),A\$:GOT

O145

620 IFBUTTON(BU)THEN620ELSE:GOSUB220:GOSUB125:IFA=5GOSUB225:GOTO 145ELSEIFV(A)=-1THEN620ELSEGOSUB 215:HPRINT(1,17),"Tank"+STR\$(A+1)+"": "+O\$(V(A)):IFV(A)=11THEN109 ELSE145

625 CD=0:GOSUB215:HPRINT(1,17)," SCORE="+STR\$(V(7))+ " ASSETS= \$" +MID\$(STR\$(V(8)),2):GOTO115

630 WIDTH40:CLS5:ATTR0,4:PRINTTAB(13)"* TRAVEL MAP *":PRINT:ATTR 0,0:FORK=1TO200:IFK=R THENATTR0, 0,B ELSEATTR0,0

635 IF(A(K)AND64)=64THENPRINTHEX \$((A(K)AND15))" ";ELSEPRINT" "; 640 NEXT:ATTR0,4:PRINT:FORK=1TO1 5:A=K*5:PRINTHEX\$(K)"="";:FORC=0T O3:IF(K ANDD(C))=D(C)THENPRINTMI D\$("NSEW",C+1,1);ELSEPRINT"."; 645 NEXT:PRINT" ";:NEXT

650 IFBUTTON(BU)THEN670ELSEX=JOY STK(0):X=(JOYSTK(JH)/1.6)AND254: Y=INT(JOYSTK(JV)/6.4):MR=X/2+Y*2 0+1:LOCATEX,Y+2:IFMR=R THENATTR0 ,0,B ELSEATTR0,0

655 IFXJ=X ANDYJ=Y THEN650ELSEXJ =X:YJ=Y:LOCATE0,17:ATTR0,4:PRINT STRING\$(200,32):LOCATE0,17:IF(A(

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MR)AND64)=64THENPRINTR$(R(MR))EL
SE65Ø
66Ø FORK=ØTO35:IFO(K)=MR THENPRI
NTO$(K)",":NEXTELSENEXT
665 GOTO65Ø
67Ø CD=Ø:ATTRØ,Ø:HSCREEN2:GOTO11
5
675 CD=Ø:POKE65496,Ø:GOSUB245:IN
PUT"SAVE/LOAD";A$:INPUT"disk/tap
E/aBORT";Q$:IFQ$="D"THENDN=1ELSE
IFQ$="T"THENDN=-1ELSEHSCREEN2:GO
TO115
68Ø PRINT:INPUT"Prepare device &
press ENTER";Q$:PRINT:IFA$="S"
HENPRINT"SAVING":OPEN"O",DN,"C":
PRINT#DN,R:FORK=ØTO9:PRINT#DN,V(
K);:NEXT:FORK=ØTO35:PRINT#DN,O(K
);:NEXT:FORK=1TO2ØØ:PRINT#DN,R(K
);A(K);:NEXT:CLOSE:HSCREEN2:GOTO
115
685 IFA$="L"THENPRINT"LOADING":O
PEN"I",DN,"C":INPUT#DN,R:FORK=ØT
O9:INPUT#DN,V(K):NEXT:FORK=ØTO35
:INPUT#DN,O(K):NEXT:FORK=1TO2ØØ:
INPUT#DN,R(K),A(K):NEXT:CLOSE:HS
CREEN2 ELSE675
69Ø FORA=ØTO4:IFV(A)=-1GOSUB23ØE
LSEOG=V(A):IFOG>22THENOG=16:GOSU
B255ELSEIFOG>14THENOG=15:GOSUB25
5ELSEGOSUB255
695 NEXT:PR=Ø:GOTO2ØØ
7ØØ CD=Ø:EXECF2:HCOLOR4,Ø:HPRINT
(1,15),"Cease Operations":HPRINT
(1,17),"Are you sure (Y/N)?"
7Ø5 Q$=INKEY$:IFQ$=""THEN7Ø5ELSE
IFQ$<>"Y"THENGOSUB225:GOTO115ELS
E275
71Ø POKEP1,Ø:POKEP2,Ø:EXECF1:FOR
X=8TO24ØSTEP24:FORY=7TO67STEP11:
HCOLOR9,8:HLINE(X,Y)-(X+22,Y+9),
PSET,BF:HDRAW"BM=X; ,=Y;C13R22D1Ø
C8L22U1Ø":NEXTY,X:HDRAW"BF1ØBR13
C2L239BD4R239BD6L239BD8R239"
715 IFR(R)=3THEN725ELSEFORK=1TO1
ØØ:HSET(RND(238)+8,RND(82)+8,RND
(8)):NEXT:RETURN
72Ø POKEP1,221:POKEP2,136:EXECF1
725 HCOLOR14,8:HLINE(18,14)-(78,
56),PSET,BF:HLINE(238,14)-(178,5
6),PSET,BF:GOSUB155:IFR=39THENA$
="LOCK":B$="SMITHS"ELSEIFR=59THE
NA$="GUNS":B$="&AMMO"ELSE735
73Ø HDRAW"BM24,4ØC3R48BR112R48C4
":HCOLOR4,Ø:FORK=ØTO2ØSTEP2Ø:HPR
INT(4+K,3),A$:HPRINT(3+K,4),B$:N
EXT:GOTO745
735 FORK=38TO198STEP16Ø:FORX=K T
OK+4ØSTEP2Ø:FORY=14TO42STEP14:HD
RAW"BM=X; ,=Y;C9L19D13C12R19U13":
NEXTY,X,K:IFR=19THENFORY=35TO195
STEP16Ø:FORX=ØTO26STEP26:FORK=ØT

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O2:HCIRCLE(Y+K+X,54),15,1,2.5,.5
,1:NEXTK,X,Y
74Ø IFR(R)=3THENFORX=2ØTO18ØSTEP
16Ø:HDRAW"BM=X; ,46C3R56H1ØU1ØL36
D1ØG1Ø":HPAINT(X+9,44),3,3:NEXT:
RETURN
745 FORX=78TO238STEP16Ø:HDRAW"BM
=X; ,14C8D42L63C4U42R63":NEXT
75Ø HCOLOR13,8:HLINE(8,72)-(247,
9Ø),PSET,BF:HDRAW"BM8,91C8E2ØR3Ø
G2ØR3ØE2ØR3ØG2ØR3ØE2ØR3ØG2ØR3ØE2
ØR3ØG2Ø":HCOLOR14,8:HLINE(8,9Ø)-
(247,94),PSET,BF:HPAINT(9,98),8,
14:RETURN
755 POKEP1,85:POKEP2,85:EXECF1:H
DRAW"BM8,44C14E1ØF1ØE13F13E8F8E1
ØF1ØE9F9E15F15E5F5E15F15E15F15E1
4F14E5F8D12H1ØG1ØH13G13H8G8H1ØG1
ØH9G9H15G15H5G5H15G15H15G15H14G1
4H5G1ØD5R79FR79E2R81":HPAINT(1Ø,
1Ø),12,14:HPAINT(1Ø,54),15,14:HP
AINT(1Ø,62),Ø,14
76Ø HCIRCLE(51,9Ø),3Ø,15,.3:HPAI
NT(5Ø,9Ø),15,15:HCIRCLE(5Ø,9Ø),3
,9,.5:HDRAW"BM5Ø,9ØC8U4ØM+1Ø,+5M
-9,+5D31C14M+22,-6R4M+2Ø,-5D6M-8
,-3":HPAINT(53,55),3,8:HPAINT(94
,82),14,14:C=14:FORX=42TO5Ø:HCIR
CLE(X,9Ø),3Ø,C,.3,.4,.7:IFX=45TH
ENC=4:NEXTELSENEXT
765 HDRAWCL$:FORK=1TO5Ø:HSET(RND
(239)+8,RND(3Ø)+7Ø,15):NEXT:RETU
RN
77Ø POKEP1,34:POKEP2,34:EXECF1:H
DRAW"BM8,6ØC14R8ØER8ØFR78":HPAIN
T(1Ø,64),1Ø,14:FORK=1TO1ØØ:HSET(
RND(235)+1Ø,RND(4Ø)+6Ø,RND(2)*4)
:NEXT
775 FORK=1TO8:X=RND(2Ø)*1Ø+2Ø:Y=
RND(4)*4+8:C=RND(5)+2:FORA=1TO9:
HCIRCLE(X,Y),A,C,.4:NEXT:X=X-8:H
DRAW"BM=X; ,=Y;C=C;H4D8E4LH3D6E3L
H2D4E2LBR16BUC8R":NEXT
78Ø IFR(R)=34THENFORK=ØTO8:HCIRC
LE(228,9Ø),K,9,.4:NEXT
785 RETURN
79Ø POKEP1,68:POKEP2,68:EXECF1:H
DRAW"BM8,6ØC14R2ØM+3Ø,+4R5ØM+2Ø,
-2R8ØM+4Ø,-2U1ØL24Ø":HPAINT(1Ø,1
Ø),12,14:HPAINT(1Ø,55),2,14:HDRA
W"BM2Ø,35C4R4F2E2R2BR2ØBUR4F2E2R
4BR3ØBD2R4F2E4R4 XCL$;"
795 IFR(R)=33THENFORK=ØTO8:HCIRC
LE(228,9Ø),K,13,.4:NEXT
8ØØ RETURN
8Ø5 POKEP1,136:POKEP2,136:EXECF1
:HDRAW"BM8,6ØC14R24ØD18L24ØDR24Ø
DL24Ø":HPAINT(1Ø,7Ø),13,14:FORX=
9TO247STEP4:HDRAW"BM=X; ,81C3D2Ø"
:NEXT:HDRAW"EM72,12C2R113D2ØL113
U2ØHR115D22L115U22BH3BL2C4R125D2

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9L125U29":HPAINT(78,20),4,2
810 FORX=80TO82:HDRAW"BM=X; ,26C1
U5E4F4ND5E4F4D5":NEXT:HDRAW"BM76
,14C3R26D16L26U16BR34BD2C8R40BD4
L40BD4R40BD4L40BR50R20BU4L20BU4R
20BU4L20":Y=46:FORC=15TO0STEP-15
:FORY=Y TOY+6STEP2:HDRAW"BM8,=Y;
C=C;R239":NEXTY,C
815 HDRAW"BM8,52C14R20NU44E6U38L
26BR46D44R160NU44E6U38L28D30L127
U30L10BM8,20R16D20L16C12BER14BU2
L14BU4R14BU2L14BU4R14BU2L14BM60,
20C14NR4D20NE4R146U4NL14U16L14
820 HPAINT(10,9),13,14:HPAINT(10
0,50),13,14:HPAINT(30,10),14,14:
HPAINT(218,10),14,14:HPAINT(200,
38),12,14:HDRAW"BM9,44C4R12BD2L1
2BD2R12BUC8L12BU2R12BU2L12BM8,10
C4R18C8D2L18BR48R8BU2C4L8NDBR138
R18C8D2L18"
825 FORX=72TO156STEP42:HDRAW"BM=
X; ,44C4R36BD2L36BD2R36BUC8L38BU2
R36BU2L36":NEXT:RETURN
830 POKEP1,221:POKEP2,221:EXECFL
:FORY=17TO43STEP2:HDRAW"BM8,=Y;C
15R239":NEXT:FORY=45TO101STEP2:H
DRAW"BM8,=Y;C0R239":NEXT:HDRAW"B
M247,37C14M-10,-20U9LD9L228D24R1
00E8R20G20L109D15R109NU15E20U15D
4R112D4L112D4R112D4L112"
835 HPAINT(10,10),3,14:HPAINT(10
,42),4,14:HPAINT(10,62),12,14:HP
AINT(119,60),2,14:HPAINT(200,39)
,8,14:HPAINT(200,47),8,14:FORX=0
TO40:HCIRCLE(200,70),X,RND(8),.3
:NEXT:RETURN
840 POKEP1,221:POKEP2,221:EXECFL
:FORY=50TO60STEP2:HDRAW"BM8,=Y;C
2R239":NEXT:FORY=62TO100STEP2:HD
RAW"BM8,=Y;C12R239":NEXT:HDRAW"B
M48,7C14D53R148NU53E10U44L20D49L
56NU49BM+10,-6NR46U43L26D49L56NU
49BM+10,-6NR46U43"
845 FORX=64TO204STEP70:HPAINT(X,
20),14,14:NEXT:HPAINT(54,20),10,
14:HDRAW"BM59,55C8M+10,-6BR72M-1
0,+6"
850 G$="C8U3LD3LU3LD3LU6ED4RU6ED
7RU16G2F2U8RD14EU22ED20EU30LD10"
:FORK=74TO106STEP8:X=K+72:HDRAW"
BM=K; ,52XG$;BM=X; ,52XG$;":NEXT:F
ORX=8TO46STEP4:HDRAW"BM=X; ,7C6D4
3BR200U43":NEXT:RETURN
855 POKEP1,221:POKEP2,221:EXECFL
:FORY=60TO100STEP2:HDRAW"BM8,=Y;
C9R239C14":NEXT:C=8:B=248:FORK=8
TO300STEP8:Y=K:X=K:H=256-K:IFY>6
0THENY=60:IFX>248THENX=248:H=8:C
=C+8:B=B-8
860 HLINE(X,C)-(X-Y+C,Y),PSET:HL
INE(H,C)-(B-X+Y,Y),PSET:NEXT:FOR

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X=18TO247STEP80:HDRAW"BM=X; ,7C8D
55L3BUC4U54RD54":NEXT:RETURN
865 POKEP1,0:POKEP2,0:EXECFL:HDR
AW"BM8,80C14R240U30L240":HPAINT(
10,10),12,14:HPAINT(10,70),13,14
:HDRAW"BM108,66C3U20R60D20L5H4L7
G4L20H4L7G4L5BU7BR10R40U10L40D10
BR5BUC8U8BR8D8BR8U8BR8D8BR8U8":H
PAINT(110,64),3,3:FORY=3TO5:HCIR
CLE(120,68),Y,8
870 NEXT:HCOLOR13,0:HLINE(138,10
0)-(238,80),PSET,BF:FORX=138TO23
8STEP4:HDRAW"BM=X; ,100C6U20C0":N
EXT:HLINE(173,100)-(203,97),PSET
,BF:HDRAW"XCL$;BM138,100C8U20E50
M-30,+52NM-20,-2M+30,+2NU54M+35,
-2NM-35,-52M+15,-2NH50D20L35U3NL
27U9L30D12NE3L35"
875 C=0:FORX=145TO240STEP30:C=C+
1:HPAINT(X,78),C,8:NEXT:HDRAW"BM
60,63C8M-15,+38R30M-15,-38":HPAI
NT(60,65),8,8:HPAINT(178,95),8,8
:C=0:FORY=0TO8:C=C+1:HCIRCLE(60,
63),27+Y,C:HCIRCLE(60,63),Y,C:NE
XT:HDRAW"BM60,63C4U32RD64LU32L32
DR64UL32E22FG44HE22F22GH44EF"
880 RETURN
885 POKEP1,238:POKEP2,238:EXECFL
:FORK=1TO50:X=RND(200)+8:Y=RND(5
2)+7:H=RND(30):V=RND(20):C=RND(7
):HDRAW"BM=X; ,=Y;C=C;M+=H; ,+=V;":
NEXT:GOSUB210
890 C=0:FORX=224TO236STEP2:C=C+1
:FORY=10TO70STEP10:HDRAW"BM=X; ,=
Y;C=C;F5G5":NEXTY,X:FORC=1TO7:HC
OLORC,0:HPRINT(1+C,C),MID$("RAIN
BOW",C,1):NEXT:HDRAW"BM8,80C8R23
9D21L239U21BUC13R78U72RC8D72C13R
79U72RC8D72C13R79U72RC8D72":HPAI
NT(10,90),8,8:RETURN
895 POKEP1,238:POKEP2,238:EXECFL
:FORY=40TO100STEP2:HDRAW"BM8,=Y;
C15R239":NEXT:HDRAW"XCL$;BM8,32C
8R239BD4L239":FORX=8TO247STEP10:
HDRAW"BM=X; ,29D11":NEXT
900 HDRAW"BM30,65C13R10U15R10U10
L10U10L10D10L10D10R10D15BM77,79U
40E6R20F6D40L32BM150,71U5R10NM+4
,+2U33E4ND39F4D33R10D5L28BM204,5
9U30R25D30L25"
905 HPAINT(32,63),13,13:HPAINT(7
9,77),13,13:HPAINT(152,69),13,13
:HPAINT(162,62),4,13:HPAINT(206,
58),13,13
910 HDRAW"BM30,65C8R10U15R10U10B
L10U10BGL0BD10L10BM109,79U40H6BM
178,71U5BL10NM-4,+2BU33M-4,+2C13
M-4,-2C8BM230,59U30"
915 Y=65:X=35:GOSUB920:Y=79:X=93
:GOSUB920:Y=75:X=164:GOSUB920:Y=
59:X=217:GOSUB920:HPRINT(10,6),"

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IBM":HDRAW"BM22Ø,44C3L6HR8EL1ØUR
1ØUL1ØER8HL6R2FC8E3":RETURN
92Ø C=14:FOR Y=Y TO Y+2Ø:HCIRCLE(X
,Y),25,C,.2,.5,1:C=15:NEXT:HDRAW
"BM=X; ,=Y;C14NL25R25BH2L46":RETU
RN
925 POKEP1,2Ø4:POKEP2,2Ø4:EXECF1
:HDRAW"BM8,32C13R239BD4L239BD2C1
4R239C13":HPAINT(1Ø,98),Ø,14:FOR
X=8TO247STEP1Ø:HDRAW"BM=X; ,29D11
":NEXT:FORK=1TO1ØØ:HSET(RND(238)
+8,RND(61)+37,14):NEXT
93Ø H=Ø:FORK=1TO7:X=RND(1Ø)*2Ø+1
Ø:Y=RND(1Ø)+5Ø:H=1AND(H+1):C=H+8
::HDRAW"BM=X; ,=Y;C=C;U8NF4HL13DR
14DL14DR14DL2ND4L12D4BR2BDU9L6UR
1ØHL8ER5BL2HL7HBR18GL1Ø":NEXT
935 IFR(R)=25THENFORK=15TO225STE
P35:X=K+RND(4):Y=RND(13)+13:HDRA
W"BM=X; ,=Y;XFS$":NEXTELSEHDRAWC
L$:IFR(R)=26THENFORK=ØTO8:HCIRCL
E(228,9Ø),K,15,.4:NEXT
94Ø RETURN
945 POKEP1,2Ø4:POKEP2,2Ø4:EXECF1
::HDRAW"XCL$;BM8,78C5R239BDL239B
DC14R1ØØU4ØR3ØU1ØR2ØNF4D1ØR4NU6R
26F4D36L4NU4ØL8ØR139":HPAINT(12Ø
,7Ø),4,14:HPAINT(1Ø,1ØØ),13,14
95Ø HPAINT(16Ø,35),14,14:HPAINT(
19Ø,45),14,14:FORX=114TO178STEP8
:FOR Y=44TO7ØSTEP4:HLIN(X,Y)-(X+
4,Y+2),PSET,BF:NEXTY,X:HLIN(138
,74)-(154,8Ø),PSET,BF:HDRAW"BM13
8,8ØC13U6R8ND6R8D6CØR34GL31BL2ØL
27HR3ØC2BM143,39U7RD7RU7D3R4DNL4
D3U7RD7RU7C14":RETURN
955 POKEP1,Ø:POKEP2,Ø:EXECF1:HDR
AW"BM8,1Ø2C14U2E1ØU1ØR12ØD1ØF12R
98U22L11ØU66L12ØD66NL1ØD4":HPAIN
T(1Ø,1Ø),4,14:HPAINT(3Ø,5Ø),14,1
4:HPAINT(2Ø,1ØØ),13,14:HDRAW"BM1
9,8ØC13U66R59ND66R59C8D66L12ØC13
U67R122C8D68L122"
96Ø HDRAW"BM68,45C13D1ØRU1ØRD1ØR
U1ØRD1ØRU1ØBR1ØD1ØRU1ØRD1ØRU1ØRD
1ØRU1Ø":FORX=154TO24ØSTEP8:FOR Y=
84TO96STEP6:C=RND(7):HDRAW"BM=X;
,=Y;C=C;EFGHC2":NEXTY,X
965 IFR=25THENHPRINT(19,4),"WEST
POINT":HPRINT(2Ø,5),"HOSPITAL"E
LSEHPRINT(21,4),"FALSOFT":HPRINT
(22,5),"-WEST":HDRAW"BM198,54C8D
1ØL1ØU1ØR1ØC13EL12D12GU14R14C14D
14L14ER12U12":HPAINT(19Ø,58),2,8
97Ø RETURN
975 POKEP1,187:POKEP2,187:EXECF1
:HDRAW"XCL$;BM8,8ØC14R239U16C4L2
39BU16R239":HPAINT(1Ø,1ØØ),13,14
:FORX=8TO247STEP24:HDRAW"BM=X; ,8
ØC4U4ØEC8FD4ØC11":NEXT
98Ø IFR=126THENGOSUB15Ø:IF(A(R)A

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ND128)<>128THENHDRAW"BM83,79C4U3
2R68D16L68DR68M-68,+15R68NU16M-6
8,-15":HPRINT(11,7),"FALSOFT"
985 RETURN
99Ø POKEP1,187:POKEP2,187:EXECF1
:HDRAW"XCL$;BM8,78C5R239BDL239BD
C14R8ØU4ØNR132L2E1ØR114NM+18,+12
F1ØL2D4ØL6ØU1ØL2ØD1ØL6ØR148NU38R
22"
995 HPAINT(1Ø,1ØØ),13,14:HPAINT(
1ØØ,7Ø),4,14:HPAINT(1ØØ,35),9,14
:HPAINT(22Ø,7Ø),14,14:HPAINT(155
,78),14,14:FORX=93TO213STEP16:FO
RY=44TO66STEP6:HLIN(X,Y)-(X+8,Y
+3),PSET,BF:NEXTY,X:HDRAW"BM138,
8ØC13U1ØR1ØND1ØR1ØD1ØL2ØCØL5ØFR4
6BR26R56EL6ØC2BU5BR2R4GL"
1ØØØ RETURN
1ØØ5 POKEP1,68:POKEP2,2Ø4:EXECF1
:HDRAW"BM8,71C14R239UL239UR239UL
239UR239UL239":HPAINT(1Ø,1ØØ),4,
14
1Ø1Ø FORX=8TO247STEP3Ø:HDRAW"BM=
X; ,1Ø1C14E3Ø":NEXT:HDRAW"BM8,91R
239BU1ØL239":FORX=36TO247STEP6Ø:
FOR Y=76TO96STEP2Ø:HPAINT(X,Y),12
,14:NEXTY,X:FORX=8TO247STEP58:HP
AINT(X,86),12,14:NEXT:GOSUB155:R
ETURN
1Ø15 POKEP1,2Ø4:POKEP2,2Ø4:EXECF
1:C=11:FORX=ØTO2ØSTEP2Ø:FOR Y=X+6
ØTOX+81STEP2:HDRAW"BM8,=Y;C=C;R2
39C8":NEXT:C=2:NEXT:HLIN(8,7)-(
247,59),PSET,BF::HDRAW"BM8,78C14
R4ØNU74E18U54R4ØD72R1ØØNU72E18U5
4"
1Ø2Ø HPAINT(1Ø,1Ø),13,14:HPAINT(
12Ø,1Ø),13,14:HPAINT(6Ø,1Ø),14,1
4:HPAINT(21Ø,1Ø),14,14:FOR Y=12TO
54STEP14:HLIN(12,Y)-(42,Y+1Ø),P
SET,BF:HDRAW"BM12,=Y;C8NR3ØD1ØC4
R3ØU1ØC14":NEXT
1Ø25 HDRAW"BM112,12C14R38D45L38N
U45EC8U43R36C4D43L36BR46R38U43C8
L38D43BGC14R4ØU45L4ØD45BE6R28U15
BU3U15L28D15R28BD3L28D15BEC4U13R
26C8D13L26BU18R26U13C4L26D13CØ":
HLIN(167,38)-(19Ø,49),PSET,BF:H
LIN(167,31)-(19Ø,2Ø),PSET,BF
1Ø3Ø HCOLOR14,Ø:HLIN(117,15)-(1
45,54),PSET,BF:FOR Y=25TO44STEP19
:FORX=2TO9:HCIRCLE(131,Y),X,4:NE
XTX,Y:HDRAW"BM14Ø,25C4D19LU19":F
ORY=2ØTO38STEP18:FORX=1TO1Ø:HSET
(RND(21)+167,RND(1Ø)+Y,RND(7)):N
EXTX,Y:HDRAW"BM114,65C8R84BD4L84
BD4R84BUC4L84BU4R84BU4L84
1Ø35 RETURN
1Ø4Ø POKEP1,68:POKEP2,68:EXECF1:
FOR Y=8ØTO1ØØSTEP2:HDRAW"BM8,=Y;C
12R239":NEXT:HDRAW"BM8,1Ø1C14E21

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NM247,101":HPAINT(10,10),14,14:H
DRAW"C8U73RD73BM162,78U20M+16,+1
D20M-16,-1":HPAINT(164,76),13,8
1045 HDRAW"BU17BR7R4FD5GL5HU5EBD
2BRD3BR3U3BD8D3BL3U3BLBU2GD5FR5E
U5HL5":RETURN
1050 POKEP1,34:POKEP2,34:EXECF1:
HCIRCLE(120,70),70,14,.3:HCIRCLE
(120,70),72,14,.4,.5:HCIRCLE(1
20,70),72,14,.9,.5,1:HPAINT(120,
96),13,14:HPAINT(120,10),13,14:H
PAINT(120,70),3,14:HCIRCLE(120,5
0),20,14,.5,.6,.9
1055 HDRAW"BM68,28C14D10L2H2G2L3
R8BR105R2E2F2R3L9U10BM52,72E4F6E
12F6E8F6E8F6E6F6E6F6E6F8E6F8E6F1
2BM184,70G4H6G12H6G8H6G8H6G6H6G6
H6G6H8G6H8G6H12G6":HPAINT(66,32)
,4,14:HPAINT(174,32),4,14:HPAINT
(120,54),4,14:RETURN
1060 POKEP1,68:POKEP2,68:EXECF1:
FORX=61TO101STEP4:HDRAW"BM8,=Y;C
3R239":NEXT:Y=0:FORX=0TO56STEP8:
HLINE(128+X,61)-(128+X+Y,101),PS
ET:HLINE(128-X,61)-(128-X-Y,101)
,PSET:Y=Y+8:NEXT
1065 FORX=74TO176STEP16:HPAINT(X
,62),3,3:NEXT:FORX=66TO188STEP20
:HPAINT(X,72),3,3:NEXT:FORX=52TO
202STEP24:HPAINT(X,80),3,3:NEXT:
FORX=35TO203STEP28:HPAINT(X,88),
3,3:NEXT:FORX=24TO216STEP32:HPAI
NT(X,96),3,3:NEXT
1070 FORX=80TO188STEP18:HPAINT(X
,68),3,3:NEXT:FORX=72TO204STEP22
:HPAINT(X,76),3,3:NEXT:FORX=58TO
214STEP26:HPAINT(X,84),3,3:NEXT:
FORX=45TO225STEP30:HPAINT(X,92),
3,3:NEXT:FORX=35TO227STEP32:HPAI
NT(X,100),3,3:NEXT
1075 HDRAW"BM8,60C14R239":HCIRCL
E(128,101),100,14,.4,.5,1:HPAINT
(10,70),15,14:HPAINT(10,10),8,14
:FORX=8TO246STEP4:HDRAW"BM=X;7C
1D45":NEXT:HDRAW"BM247,60C0L239U
2R239U2L239U2R239U2NL239C14U20L1
0G8R18D20L18NU20BL50E8U20NG81.179
D8NR171D20R171U20"
1080 HPAINT(10,50),10,14:HPAINT(
240,50),10,14:HPAINT(182,50),9,1
4:HPAINT(10,35),0,14:HPAINT(240,
35),0,14:HDRAW"BM78,36C13U29R40D
25G4NL36U10NL36U4NL36U15":HPAINT
(80,32),13,13:HPAINT(116,32),14,
13:HPAINT(80,10),3,13:HDRAW"BM84
,14C4F4R4E8R4F4DH4L4G8L4H
1085 C=0:FORX=84TO104STEP10:HCOL
ORC,0:HLINE(X,23)-(X+6,25),PSET,
BF:C=C+1:NEXT:RETURN
1090 POKEP1,0:POKEP2,0:EXECF1:HD
RAW"BM58,80C14F6R128E6U58H6L128G

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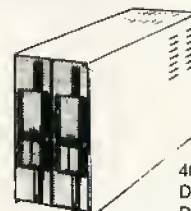
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```

6D58":HPAINT(62,80),13,14:GOSUB2
10
1095 HCOLOR8,0:HPRINT(10,3),"RAI
NBOW CARD":HPRINT(9,9),"Member:
L. Falk":HPRINT(4,11),"Press But
ton to Continue":GOSUB170:JX=XJ:
JY=YJ:CD=0
1100 IFBUTTON(BU)THEN25ELSE1100
1105 POKEP1,136:POKEP2,136:EXECF
1:R$="TOTAL DARKNESS":GOTO80
1110 HSCREEN2:HCLS13
1115 HDRAW"C8BR10BU2L6C3HR8EL10C
8HR12EL2LG12":RETURN:'CLUB
1120 HDRAW"C8BR15BU2R8UL8ER6UL6E
R4UL4M-3,-1R10UC3L10C8UL12UR22DL
10UR2R4":RETURN:'GUN
1125 HDRAW"C8NE16RE16D4L10U4F16U
H15":RETURN:'WIRE CUTTER
1130 HDRAW"C8BU8BR2E4F4G4H4RE3F3
G3H3R20D3LU2L4D2LU2L4D2LU2L2":RE
TURN:'KEY
1135 HDRAW"BU6BR6C10R12EL14HR16B
EC3L18BHC8R20UL20BEC1R18BHC10L16
ER14HL12":RETURN:'BURGER
1140 FORK=1TO6:HCIRCLE(OX+12,OY-
10),K,14:NEXT:RETURN:'SILVER DOL
LAR
1145 HDRAW"C4BE10R6HL4ER2H":RETU
RN:'TOOTH
1150 HDRAW"C4BR7BU6C4R10UL10UR10
UL10UR10UL10ERBR6RC8BD3L2BL5NUNR
NDNL":RETURN:'BATTERY
1155 HDRAW"BE4C1R14UL14UR14UL14U
R14UL14UR14UL14UC9R16UNL12UNL8D1
0LU4NL14U5":RETURN:'CAKE
1160 HDRAW"C4BU8BR4R2EL4ER18FL4F
R2BU2BHL16HR18EL4ER2BL16L2GR4":R
ETURN:'BONE
1165 HDRAW"C3BR3U15RD15RU15RD15R
U15RD15RU15RD15RU15RD15RU15ND15B
LC8U2E2LG2D2BD7HLGLUR":RETURN:'G
AS
1170 HDRAW"C4BE4R16UL16UR16UL16U
R16UL16UR16UL16UR16UL16UR16UL16C
8F8E8L16D12R16U12":RETURN:'LETTE
R
1175 HDRAW"C8BR13U6L2D6RU6L6U6ED
7RU8ED9RU10ED11RU12FD11RU10FD9RU
8FD7RU6":RETURN:'SHOVEL
1180 HDRAW"C4BR8BU6R10EL12UR12UL
12UR12HL10D2C14DEFREBR2DERF":RET
URN:'CARD
1185 HDRAW"C8BR3BU6F2G2U4D2R5EF2
E2F2E2F2ER2":RETURN:'DRILL
1190 IFOY=186THENRETURNELSEHDRAW
"BM216,100C11BR2U10R10BD2D8NL10M
+13,-8U8NM-13,+6L10NM-13,+6U8M-1

```

```

3,+6D8HU6GD4":HPAINT(221,98),9,1
1:HPAINT(225,88),1,11:HPAINT(225
,82),3,11:RETURN:'TREASURE
1195 HDRAW"C2BE4BR4U8RD8RU8RD8RU
8RD8RU8D3E2RFD4L4":RETURN:'CUP
1200 HDRAW"C8BU9BR3R7DL7DR7DL7DR
7L4U2G5D13G9RE8U13E5RG5D13G9":RE
TURN
1205 FORY=80TO100STEP20:FORX=8TO
233STEP25:HDRAW"BM=X; ,=Y;C8R25U2
0L25D20":NEXTX,Y
1210 RESTORE:BU=PEEK(F1+88):JH=B
U:JV=JH+1:PR=0
1215 CL$="BM20,10C4R40BDBL8L40BD
BR4R40BDBL3C13L30BR30BD4R30C4BEL
40BUBR20R30BEL35BR70BUR40BDBL10L
40BDBR5C13R14BR40BD2R14BUBR10C4L
40BUBR10R40BUBR4L40":FS$="C13R8B
EC4RL12HLR16BEC3RL20RBEC4R16LHL1
2RBEC13R8
1220 FORK=1TO34:READR$(K):NEXT:D
ATASubway,City Street,Pizza Hut
Entrance,Pizza Hut,McDonald's
Entrance,McDonalds,Locksmith Ent
rance,Locksmith Shop,Gunshop Ent
rance,Gunshop,Golf Course,Ocean,
Sharks!,Beach,Chain Fence,Carniv
al,Shooting Gallery
1225 DATATunnel,Graveyard,Pastur
e,Iron Fence,Iron Gate,Falsoft P
arking Lot,Falsoft West Bldg.,Pa
sture,Pasture,Hospital Parking L
ot,Hospital Entrance,Hall,Comput
er Room,Corner,Battle Ground,Bea
ch,Ocean
1230 X=1:FORK=F1+252TOF1+650STEP
2:R(X)=PEEK(K):A(X)=PEEK(K+1):X=
X+1:NEXT
1235 D(0)=8:D(1)=4:D(2)=2:D(3)=1
:FORK=0TO4:V(K)=-1:NEXT
1240 FORK=0TO29:READO$(K),O(K):N
EXT
1245 DATAQuarter Pounder,20,Lase
r Gun,60,Femur Bone,161,Golf Clu
b,120,Chocolate Cake,48,Cup of C
offee,48,PLUG,43,Shark's Tooth,1
58,Wire Cutters,173
1250 DATAShovel,132,Key,40,Plast
ic Card,190,Silver Dollar,108,Dr
ill,10,Letter,24,Gas,27,Gas,80,G
as,200,Gas,192,Gas,171,Gas,181,G
as,61,Gas,88,Battery,76,Battery,
159,Battery,148,Battery,101,Batt
ery,86,Battery,111,Battery,47
1255 FORK=30TO35:O(K)=0:NEXT
1260 R=51:X=314:Y=4:JX=X:JY=Y:RE
TURN

```




Castle of Death



16K
Best
of Show

By Chinarat Ruangchotvit

You've heard stories throughout the village that there are jewels hidden in a nearby castle. Supposedly, the jewels are the famous South American Crown jewels that were lost years ago. According to legend, a lost king found the castle in the forest just beyond the village and decided to take shelter there. He never left and eventually died peacefully with his precious stones.

You quickly decide you must find the castle and the jewels. As the stories go, many others have gone before you, yet not one of them has ever returned. The jewels might already have been found. Also, some danger obviously exists, but it is a chance you feel you must take. After all, you are strong and wise. You have every confidence you can find the treasure.

After weeks of searching the forest, you finally stumble across a large fortress of a castle. All that remains is to find the jewels hidden inside. Or is it?

Loading and Playing

The Castle of Death is a text Adventure that will run on any CoCo with Extended Color BASIC. Due to memory limitations, in order to play the game on a 16K machine you must use a cassette-based system and enter **POKE 25, 6:NEW** before loading. This will clear enough memory for the program. If you have 32K of memory or more, you don't need to enter this command.

The Castle of Death involves a maze of rooms. Because of the nature of this Adventure, it would be very wise to map your progress through the castle.

To move from room to room through the passageways, use the commands

Chinarut Ruangchotvit is 14 years old and lives in Ramsey, New Jersey. He has been programming on the Color Computer for the past three years.

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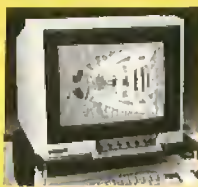
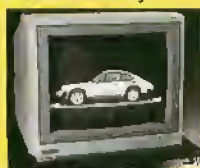
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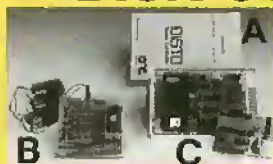
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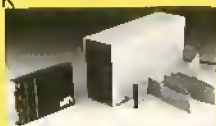
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VIP Writer III

WORD PROCESSOR • SPELLING CHECKER • PRINT SPOOLER

"...Nearly every feature and option possible to implement on the Color Computer. The design of the program is excellent; the programming is flawless." --The RAINBOW OCTOBER 1983

That's what they said about VIP Writer. Wait until they review VIP Writer III! We've added even more features and options to make the VIP Writer III the BEST word processor for the CoCo 3!

SCREEN DISPLAY OPTIONS

VIP Writer III has a screen of 32, 40, 64 or 80 characters wide by 24 lines using the CoCo 3's hardware display with actual lower case letters. You can choose foreground and background colors from up to 64 different hues. Color can be turned ON or OFF for the best possible display using a color or monochrome monitor or TV set. VIP Writer III has a built in on-line context sensitive help facility which displays command usage in easy to read colored windows. VIP Writer III also runs at double clock speed!

TEXT FILE STORAGE

There is a 48K text buffer and disk or cassette file linking allowing virtually unlimited text space. In addition, there is a 48K print spooler to allow you to print one document while editing another.

EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead, typematic key repeat and key beep for flawless text entry, end of line bell, full four way cursor control with scrolling, top of textfile, bottom of textfile, page up, page down, top of screen, bottom of screen, beginning of line, end of line, left one word, right one word, DELETE character, to beginning or end of line, word to the left or right, or entire line, INSERT character or line, LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards, BLOCK copy, move or delete with up to TEN simultaneous block manipulations, TAB key and programmable tab stops, three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and disk file linking for continuous printing.

TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! All of these format parameters can be altered ANYWHERE within your text file.

TEXT FILE COMPATIBILITY

VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII file format. You can use VIP Writer III to create BASIC, assembly, PASCAL or C files. VIP Writer III also allows you to save and load files using DISK or CASSETTE in the case of an emergency. You can even read disk directories, display free space on a disk and kill disk files.

PREVIEW PRINT WINDOW

The VIP Writer III features an EXCLUSIVE format window which allows you to preview your document BEFORE SENDING IT TO YOUR PRINTER! You are able to see margins, page breaks, orphan lines etc. This feature makes hyphenation a snap!

PRINTING

VIP Writer III supports most any printer serial or parallel using the parallel interface described in Nov-Dec, '87 RAINBOW magazine, or an external serial to parallel interface, and gives you the ability to select baud rates from 110 to 9600. You are able to imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has twenty PROGRAMMABLE PRINTER SEQUENCES which allow you to easily control all of your printers capabilities such as underline, bold, italics, superscript and subscript using simple keystrokes. Additional printer features include: single sheet pause, print pause, word length and line feed selection.

PRINT SPOOLING

VIP Writer III incorporates a built in print spooler which allows you to print one document WHILE you are editing another. You no longer have to wait until your printer is done printing before starting another job!

DOCUMENTATION

VIP Writer III is supplied with a 125 page instruction manual which includes a tutorial, glossary of terms and a complete index. The manual is well written and includes many examples to aid in understanding and application.

SPELLING CHECKER

VIP Writer III includes VIP Speller for NO ADDITIONAL COST! VIP Speller automatically checks text files for words to be corrected, marked for special attention or even added to the dictionary. You can even view the misspelled word in context! VIP Speller comes with a specially edited 50,000 word dictionary, and words can be added to or deleted from the dictionary or you can create one of your own.

THE ORIGINAL VIP WRITER

VIP Writer is also available for CoCo 1 and 2 owners and has all the features found in the VIP Writer III including VIP Speller except for the following: The screen display is 32, 51, 64 or 85 columns by 21 or 24 rows. Colors other than green, black or white are not supported. Help is not presented in colored windows. Double clock speed is not supported. Parallel printer interface is not supported. Printer spooler is not available. Even so, the VIP Writer is a CoCo 1 or 2 owners best choice in word processors.

VIP Writer III	Disk \$79.95
VIP Writer	Disk \$69.95
VIP Speller	Disk \$34.95

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UP, DOWN, LEFT and RIGHT. Obviously, there is more than one floor to this castle. When referring to a door or window, you must specify its location. For example, to open a door on your left enter OPEN LEFT DOOR. Any time you open a door or window, you automatically go through it to the next room.

When the Adventure starts, you will have 40 strength points. If, during the course of your travels, your strength should drop to zero, you will lose one of your two "lives." (You are given a second chance.)

Many dangers lurk within the walls of the castle. You will have to fight many foes. Upon entering a room that con-

tains an enemy, you will be forced to fight at least one round (a round consists of each combatant having one turn to hit the other). After each round, you will be given the option of continuing the fight or trying to escape. Make your decision carefully as some foes carry objects of great importance to your success. If you don't try to escape, the fight will continue until one of the combatants dies.

As you travel through the castle, be sure to use the SEARCH command to find any objects hidden in a particular room. Of course, many rooms will not contain any such items.

The STATUS command is used to determine your general condition and

keep track of your current possessions. Enter SCORE to get a report on the number of moves you have made.

To save a game in progress, enter SAVE, then follow the prompts. When prompted for a filename, make sure your tape or disk is ready before pressing ENTER. The LOAD command works in the same manner.

One final word: *The Castle of Death* can be solved many different ways. The object is to complete the Adventure in as few moves as possible. Good Luck!

(Questions or comments concerning this program may be directed to the author at 242 Davidson Avenue, Ramsey, NJ 07446. Please enclose an SASE when writing for a response.) □

90	.....109	745	.....57
210	.....10	880	.....137
370	.....239	1080	.....54
470	.....73	2040	.....175
495	.....25	5300	.....233
506	.....128	5640	.....92
530	.....179	7000	.....99
548	.....213	END	.....207

The listing: CASTLE

```

0 GOTO200
1 FORX=1TO3000:NEXT:RETURN
2 A$=INKEY$:IF A$="" THEN2
3 PLAY"T2O1L8B":RETURN
4 PRINT"IT HITS YOU FOR"X"UNITS
  OF      DAMAGE":HP=HP-X:PLAYD$:
  RETURN
5 GOSUB1:GOTO200
6 PRINT"BUT LUCKILY IT MISSES":G
  OTO3000
7 PLAY"T2L4P2O3CP96CL3FL4P24CFAP
  64CFAP64CFAFAO4CO3AFCP64CP96CL3F
  ":RETURN
8 PRINT"EXCUSE ME BUT I DON'T HA
  VE THAT "A$" IN MY VOCABULARY":G
  OTO410
9 PRINT"THAT IS NOT POSSIBLE":GO
  TOL410
10 FORX=1TO1200:NEXT:RETURN
11 PRINT"PLEASE INDICATE WHICH "
  A$:GOTO410
20 CLEAR300:CLS3:PRINT@72,"C A S
  T L E O F";:PRINT@140,"D E A T
  H";:PRINT@226,"BY:";:PRINT@295,
  "CHINARUT";:PRINT@363,"RUANGCHOT
  VIT";
50 HP=40:DIM DL(67),DR(67),B(67)
  ,R(67),LU(67),LD(67),E(67),M(67)
  ,P(67),WR(67),WL(67),A(67),O(69)

```

```

90 FORX=8TO55:READDL(X):NEXT:FOR
  X=7TO54:READDR(X):NEXT:FORX=2TO6
  3:READB(X):NEXT:FORX=2TO9:READR(
  X):NEXT:R(20)=1:FORX=28TO33:READ
  R(X):NEXT:R(43)=1:R(55)=1:R(59)=
  1
150 FORX=3TO55:READLU(X):NEXT:FO
  RX=14TO66:READLD(X):NEXT:FORX=57
  TO66:READWR(X):NEXT:FORX=57TO64:
  READWL(X):NEXT
175 E(5)=1:E(24)=1:E(26)=1:E(35)
  =1:A(2)=1:A(9)=1:A(19)=1:A(28)=1
  :P(2)=1:P(13)=1:P(15)=1:P(17)=1:
  P(21)=1:P(31)=1:P(26)=1:P(38)=1:
  P(44)=1:P(50)=1:FORX=5TO57:READM
  (X):NEXT
181 VL$="DROGETLOOPEPULPUSUP DO
  WGO LEFRIGSAVLOADRISCORAI":NL$="
  TRALEFRIGROPBUTSIDELEDOOWINGA
  TPASLADSKESPEBROPOTKEYJEWEMD
185 F$="YOU FIND ":M$="A MEDALLI
  ON":T$="A BROADSWORD":X$="A MAGI
  CAL SPEAR":W$="A GOLDEN KEY":Z$=
  "WHEN YOU RAISE THE KEY,A ":Y$="
  MAGICALLY ":L$=" ON THE LEFT":R
  $=" ON THE RIGHT":G$="A LADDER G
  OING ":S$=STRING$(32,175):R=2:ML
  =2:D$="T2L4O1DDD
200 IFR=1THEN5200
210 IFR=12ORR=23ORR=34ORR=45ORR=
  56THEN5300
211 IFHP<=0THENQ=1:GOTO932
215 IFR=11ORR=47ORR=53THEN4000
220 IFG=1THEN240
230 IFM(R)=1THEN600
240 G=0:SI=0:PL=0:PR=0
250 CLS:PRINT"I SEE:",S$
260 IF(RO=1ANDR=2)ORR=3THENPRINT
  "A TRAP DOOR
265 IFR=67THENPRINT"JEWELS",,"A
  SKELETON
270 IFDL(R)=1THENPRINT"A DOOR"L$

```


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```

275 IFR=2THENPRINT"THE GATE
276 IFR=54ANDKD=ØTHEN3ØØ
277 IFWD=1ANDR=54THEN3ØØ
28Ø IFDR(R)=1THENPRINT"A DOOR"R$
29Ø IFR=41ORR=5ØTHENPRINT"A SIDE
DOOR
3ØØ IFR(R)=1THENPRINT"A ROPE FRO
M THE CEILING
31Ø IFB(R)=1THENPRINT"A BUTTON O
N THE WALL
32Ø IFWL(R)=1THENPRINT"A WINDOW"
L$
325 IFWW=1ANDR=63THEN34Ø
33Ø IFWR(R)=1THENPRINT"A WINDOW"
R$
34Ø IFR=3ORR=6ORR=1ØOR(W1=1ANDR=
19)ORR=16ORR=18ORR=27ORR=51THENP
RINT"A SIDE WINDOW":SI=1
345 IFR=44ANDKL=ØTHEN36Ø
35Ø IFLU(R)=1THENPRINTG$"UP
36Ø IFLD(R)=1THENPRINTG$"DOWN
37Ø IFE(R)=1THENPRINT"AN ELEVATO
R
38Ø IFR=2ORR=61ORR=62ORR=65THENP
RINT"A PASSAGE"L$:PL=1
385 IFR=6ØORR=61ORR=64THENPRINT"
A PASSAGE"R$:PR=1
39Ø IFO(1)=R THENPRINTT$
392 IFO(2)=R THENPRINTX$
394 IFO(3)=R THENPRINTW$
395 IFO(R+2)=R THENPRINT"A POTIO
N
396 IFO(Ø)=R THENPRINTM$
41Ø PRINTS$;:LINEINPUT"NOW WHAT
->"A$
415 IFLEN(A$)<2THEN41Ø
416 MO=MO+1:J$=LEFT$(A$,3)
417 IFJ$="STA"THEN99Ø
418 IFJ$="SEA"THEN543
42Ø V$=LEFT$(A$,3):N$=""
421 IFLEN(A$)<6THEN455
43Ø N=INSTR(A$," "):N$=MID$(A$,N
+1,3)
455 D=INSTR(A$," DO"):W=INSTR(A$
," WI")
46Ø V=INSTR(VL$,V$):IFV=ØTHENA$=
"VERB":GOTO8
47Ø N=INSTR(NL$,N$):IFN=ØTHENA$=
"NOUN":GOTO8
48Ø V=(V+2)/3:ON V GOTO527,516,4
85,5Ø2,5Ø9,51Ø,511,512,513,514,5
15,54ØØ,55ØØ,537,538,539
485 IFN=25ORD>9THENPRINT"IF YOU
ASK ME, THEY ARE JUST NORMAL
WOODEN DOORS":GOTO41ØELSEIFN=28Ø
RW>9THENPRINT"HMMM...IT APPEARS
TO BE VERY DARK OUTSIDE":GOTO
41Ø
486 IFN=13ANDR(R)=1THENPRINT"IT
LOOKS LIKE A NATURAL FIBER ROP
E, SISAL I THINK":GOTO41Ø

```

```

487 IFN=16ANDB(R)=1THENPRINT"THE
BUTTON LOOKS VERY WORN DOWN":GO
TO41Ø
488 IFN=22ANDE(R)=1THENPRINT"IT'
S A ROTTEN,WOODEN ELEVATOR WIT
H A RUSTED PULLEY ON IT":GOTO41Ø
489 IFN=43ANDSP=1THENPRINT"IT'S
A FINELY CRAFTED SPEAR INDEE
D":GOTO41Ø
49Ø IFN=46ANDSW=1THENPRINT"IT'S
APPEARS TO BE VERY NEW AND HAS A
N EYE OF THE TIGER NEAR THEHANDL
E":GOTO41Ø
491 IFN=49ANDP>ØTHENPRINT"THE PO
TION IS A VERY DARK BLUE AND HA
S A FOUL SMELL":GOTO41Ø
492 IFN=52ANDK=1THENPRINT"THE KE
Y APPEARS TO BE MADE OUT OF PUR
E GOLD":GOTO41Ø
493 IFN=1THENGOTO2ØØ
494 IFN=31ANDR=2THENPRINT"IT IS
A DOUBLE HINGED IRON GATE":GOTO4
1Ø
495 IFN=34AND(PL=1ORPR=1)THENPRI
NT"MAYBE THE PASSAGE LEADS NOWHE
RE,WHO KNOWS?":GOTO41Ø
496 IFN=37AND(LU(R)=1ORLD(R)=1)T
HENPRINT"THEY'RE CARVED WOODEN L
ADDERS":GOTO41Ø
497 IFN=4ØANDR=67THENPRINT"IT'S
AN UGLY HUMAN SKELETON":GOTO41Ø
498 IFN=55ANDR=67THENPRINT"I COU
LD SWEAR IT'S THOSE JEWELS YOU'R
E AFTER!!":GOTO41Ø
499 IFN=58ANDME=1THENPRINT"IT IS
A VERY BEAUTIFUL SOLID GOLD
MEDALLION":GOTO41Ø
5ØØ IFN>42THENPRINT"YOU DO NOT H
AVE IT"ELSEPRINT"THE PRESENCE OF
THAT IS ABSENT
5Ø1 GOTO41Ø
5Ø2 IFN=31THENPRINT"IT IS ALREAD
Y OPEN SIR":GOTO41Ø
5Ø3 IFW>9ORD>9THEN5Ø4ELSEIFN=25T
HENA$="DOOR":GOTO11ELSEIFN=28THE
NA$="WINDOW":GOTO11ELSE9
5Ø4 IFN=4AND(RO=1ORR=3)THENGOTO5
55Ø
5Ø5 IFN=7AND(DL(R)=1ORWL(R)=1)TH
ENR=R-1:GOTO2ØØ
5Ø6 IFN=1ØAND(DR(R)=1ORWR(R)=1)T
HENR=R+1:IFR=67THENGOSUB6ØØØ:GOT
O2ØØØELSE2ØØ
5Ø7 IFN=19ANDD>9AND(R=41ORR=5Ø)T
HENPRINT"YOU SMASH YOUR FACE INT
O A BRICKWALL AND TAKE A HI
T POINT OF DAMAGE":HP=HP-1:GOTO
41Ø
5Ø8 IFN=19ANDW>9ANDSI=1THENGOTO5
75Ø
5Ø9 IFN=13ANDR(R)=1THEN1Ø6ØELSEP

```



```

RINT"YOU ARE UNABLE TO DO THAT F
EAT":GOTO41Ø
51Ø IFN=16ANDB(R)=1THEND=Ø:GOTO1
Ø49ELSEPRINT"THAT DIDN'T DO A TH
ING":GOTO41Ø
511 IFLU(R)=1THENR=R+11:GOTO2ØØE
LSEPRINT"WHAT?":GOTO41Ø
512 IFLD(R)=1THENR=R-11:GOTO2ØØE
LSEPRINT"WHAT?":GOTO41Ø
513 IFN=22THEN1ØØØELSE9
514 IFPL=1THENR=R-1:GOTO2ØØØELSE9
515 IFPR=1THENR=R+1:GOTO2ØØØELSE9
516 IFN=43ANDO(2)=R THENSP=1:O(2
)=Ø:GOTO526
517 IFN=46ANDO(1)=R THENSW=SW+1:
O(1)=Ø:GOTO526
518 IFN=49ANDO(R+2)=R THENP=P+1:
O(R+2)=Ø:GOTO526
519 IFN=52ANDO(3)=R THENK=1:O(3)
=Ø:GOTO526
52Ø IFN=58ANDO(Ø)=R THENME=1:PM=
Ø:O(Ø)=Ø:GOTO526
521 IFN<>55ORR<>67THEN525
522 IFPM=1THEN7ØØØ
523 IFPM=ØTHENPRINT"THE SKELETON
SUDDENLY RISES AND SAYS, DON'T
YOU DARE TOUCH MY JEWELS!! HE
THEN STRANGLES YOU TO DEATH SO
YOU CAN ALSO LIE PEACEFULLY N

```

```

EXT TO HIM WITH HIS JEWELS.":HP=
Ø:Q=1:R=2:GOTO932
525 PRINT"I AM UNCAPABLE OF TAKI
NG THAT":GOTO41Ø
526 PRINT"IT IS NOW TAKEN":GOTO4
1Ø
527 IFN=43ANDSP=1THENSP=Ø:O(2)=R
:GOTO536
528 IFN=46ANDSW>ØTHENSW=SW-1:O(1
)=R:GOTO536
529 IFN=49ANDP>ØTHENP=P-1:O(R+2)
=R:GOTO536
53Ø IFN=52ANDK=1THENK=Ø:O(3)=R:G
OTO536
531 IFN=58ANDME=1THENME=Ø:O(Ø)=R
:PRINT"FAINTLY, YOU HEAR A VOICE
SAY THANK YOU":PM=1:GOTO41Ø
535 PRINT"I DON'T THINK YOU CAN
DROP THAT":GOTO41Ø
536 PRINT"YOU HAVE NOW DROPPED I
T":GOTO41Ø
537 IFN=49ANDP>ØTHENA=4Ø-HP:PRIN
T"AAHH...THAT WAS REFRESHING. I
T GIVES YOU"A"UNITS OF STRENGTH"
:HP=4Ø:P=P-1:G=1:GOTO41ØELSEIFP<
=ØANDN=49THENPRINT"YOU DON'T HAV
E ANY!!!":GOTO41ØELSEPRINT"I WOU
LDN'T ADVISE THAT":GOTO41Ø
538 MO=MO-1:PRINT"YOUR SCORE IS"

```

CoCo 3

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

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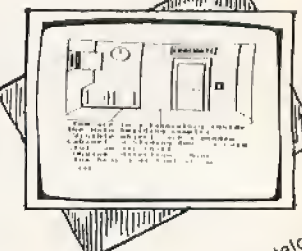



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```

MO"MOVES":GOTO41Ø
539 IF(N=52ANDK=Ø)THENPRINT"YOU
DON'T HAVE A KEY!":GOTO41Ø
54Ø IFN=52ANDR=44THENGOSUB562Ø:G
OTO2ØØ
541 IFN=52ANDR=54THENKD=1:GOSUB5
61Ø:GOTO2ØØ
542 PRINT"A NICE ATTEMPT":GOTO41
Ø
543 IFR=2THENPRINTF$"A TRAP DOOR
":RO=1:GOTO5
544 IFR=52ORR=48THENPRINTF$G$"UP
":LU(R)=1:GOTO5
546 IFR=19THENPRINTF$"A SIDE WIN
DOW":W1=1:GOTO5
547 IFR=58THENPRINTF$"A WINDOW"L
$:WL(R)=1:GOTO5
548 IFR=3THENPRINTF$"AN ELEVATOR
":E(3)=1:GOTO5
549 IFR=21ORR=36THENPRINTF$"A BU
TTON":B(R)=1:GOTO5
55Ø IFR=39THENPRINTF$"A DOOR"L$:
DL(R)=1:GOTO5
56Ø PRINT"YOU FIND NOTHING":GOTO
41Ø
6ØØ IFR=5THENK$="LICH":MP=2Ø
61Ø IFR=8THENK$="QUASSIT":MP=21
62Ø IFR=18THENK$="MIND FLARE":MP
=15
63Ø IFR=22THENK$="BUG BEAR":MP=1
5
64Ø IFR=24THENK$="YETI":MP=15
65Ø IFR=29THENK$="VERANOPS":MP=1
4
66Ø IFR=3ØTHENK$="NIGHT HAG":MP=
15
67Ø IFR=32THENK$="BIAMAT":MP=28
68Ø IFR=39THENK$="GHAST":MP=15
69Ø IFR=41THENK$="SPHINX":MP=2Ø
7ØØ IFR=48THENK$="PSEUDO DRAGON"
:MP=28
71Ø IFR=52THENK$="DRAGONNE":MP=2
8
72Ø IFR=57THENK$="TIAMAT":MP=3Ø
73Ø IFR=49THENK$="IMP":MP=15
74Ø IFR=17THENK$="YELLOW MOLD":M
P=1Ø
745 N$=RIGHT$(K$,2):GOSUB57ØØ:CL
S:IFN$="AT"THENPRINTK$" IS IN TH
E ROOM!":GOTO76Ø
75Ø PRINT"THERE IS A "K$:PRINT"I
N THE ROOM!
76Ø MP=MP+RND(5):F=1
765 IFF=ØTHEN2ØØELSE77Ø
77Ø PRINT"YOU ATTACK":E=RND(7)-1
78Ø IFE=ØTHENM=1:GOTO86Ø
79Ø IFSW>ØTHENA=RND(6):E=E+A
792 IFSP=1THENA=RND(3):E=E+A
8ØØ PRINT"YOU HIT "H$K$:PRINT"FO
R"E"UNITS":MP=MP-E:PLAY"T2L4O3AA
A":IFMP=<ØTHEN92Ø

```

```

8Ø5 PRINTH$K$" ATTACKS
81Ø X=RND(7)-1:IFX=ØTHENM=2:GOTO
86Ø
82Ø PRINTH$K$" HITS YOU":PRINT"F
OR"X"UNITS":HP=HP-X:PLAYD$:IFHP=
<ØTHEN932
83Ø PRINT"YOU HAVE"HP"POINTS OF
STRENGTH":PRINTH$K$" HAS"MP:PRIN
T"POINTS OF STRENGTH
84Ø PRINT"TRY TO ESCAPE(Y/N)
845 GOSUB2
85Ø IFA$="N"THEN94Ø
852 IFA$="Y"THEN563ØELSE845
858 PRINTH$K$" STOPS YOU":GOTO94
Ø
86Ø IFM=1THENPRINT"YOU MISSED":G
OTO81Ø
88Ø IFM=2THENPRINT"THE "K$" MISS
ES":GOTO83Ø
92Ø GOSUB7
93Ø IFMP=<ØTHENPRINT"YOU HAVE KI
LLED "H$:PRINTK$:M(R)=Ø:GOSUB1:F
=Ø:IFR=57THEN65ØØELSE2ØØ
932 IFHP=<ØTHENML=ML-1
935 IFML=ØTHENPRINT"YOU ARE DEAD
":GOTO98Ø
936 PRINT"YOU HAVE NO MORE HP'S"
,"LIVES LEFT:":ML-1:HP=4Ø:IFQ TH
ENGOSUB1ELSE84Ø
937 GOTO2ØØ
94Ø GOTO765
98Ø PRINT:PRINT"PLAY AGAIN(Y/N)
985 GOSUB2:IFA$="Y"THENRUNELSEIF
A$="N"THENCLS:ENDELSE985
99Ø PRINT"YOU HAVE:":PRINTHP"UNI
TS OF STRENGTH":PRINTP"POTIONS":
PRINTML-1:;IFML=2THENPRINT"LIFE"
;ELSEPRINT"LIVES";
991 PRINT" LEFT":IFSW>ØTHENPRINT
" "T$
992 IFSP=1THENPRINT" "X$
993 IFK=1THENPRINT" "W$
994 IFME=1THENPRINT" "M$
995 GOTO41Ø
1ØØØ IFR=3THENR=24ELSEIFR=24THEN
R=3
1Ø1Ø IFR=5THENR=26ELSEIFR=26THEN
R=5
1Ø2Ø IFR=35THEN5ØØØ
1Ø25 IFE(R)=1THEN2ØØØELSEPRINT"AR
E YOU CRAZY, I DON'T SEE AN EL
EVATOR AROUND HERE":GOTO41Ø
1Ø49 IFR=2ORR=55THEND=1
1Ø6Ø IFA(R)=1ANDD=ØTHENX=RND(3):
A=RND(4)-1:PRINTX;"ARROWS SHOOT
OUT AND ";:IFA=ØTHEN1Ø65ELSEPRIN
T"HIT YOU FOR"A"UNITS OF DAMAGE
":HP=HP-A:PLAYD$:GOTO3ØØØ
1Ø61 GOTO1Ø7Ø
1Ø65 PRINT"LUCKILY, THEY MISS YO
U":GOTO3ØØØ

```



```

1070 IFR(R)=1THENPRINT"A POTION
DROPS ONTO THE FLOOR":O(R+2)=R:P
(R)=0:GOSUB5720:GOTO3000
1075 IFB37=1ANDR=37THEN2900
1076 IFR3=1ANDR=37THEN2900
1080 IFR=3ORR=37THENPRINTT$" LIE
S ON THE FLOOR":O(1)=R:IFR=3THEN
R3=1:GOSUB5720:GOTO3000
1081 IFR=37THENB37=1:GOSUB5720:G
OTO3000
1084 IFB7=1ANDR=7THEN2900
1085 IFR=7THENPRINTX$" LIES IN F
RONT OFYOU":O(2)=R:B7=1:GOSUB572
0:GOTO3000
1090 IFR=14ORR=43THENPRINT"A AXE
SWINGS OUT AT YOU!":A=RND(2)-1:
X=RND(2):IFA=0THEN6ELSEGOSUB4:GO
TO200
1095 IFB59=1ANDR=59THEN2900
2000 IFR=59THENPRINT"THERE IS NO
W "W$" ON THEFLOOR":O(3)=R:B59=1
:GOSUB5720:GOTO3000
2005 IFR=4THENPRINT"YOU FALL DOW
N A TRAP DOOR":R=7:GOTO3000
2010 IFR=20THENPRINT"SUDDENLY YO
U ARE HYPERSPACED INTO ANOTH
ER ROOM!":R=46:GOTO3000
2012 IFR=40THEN2025
2015 IFR=25ORR=36THENPRINT" A SL

```

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EEPING GAS SEEPS INTO THE ROO
M AND WHEN YOU WAKE UP, YOU ARE
IN ANOTHER ROOM!
2020 IFR=25THENR=48ELSEIFR=36THE
NR=40
2021 IFR=40ORR=48THENGOSUB1:GOTO
3000
2025 IFR=33THENPRINT"AN KNIFE SH
OOT OUT AT YOU!":X=RND(2):A=RND
(2)-1:IFA=0THEN6ELSEGOSUB4:GOTO2
00
2035 IFR=42THENPRINT"A FLAME SHO
OTS OUT!":A=RND(2)-1:X=2:IFA=0TH
EN6ELSEGOSUB4:GOTO200
2037 IFWW=1ANDR=63THEN2900
2038 IFWD=1ANDR=54THEN2900
2040 IFR=40ORR=54ORR=63THENPRINT
"A WALL SLAMS RIGHT IN FRONT OF
YOUR FACE!":GOSUB6010
2045 IFR=40THENPRINT"YOU ARE TRA
PPED! IT COSTS YOU A LIFE TO GET
OUT":HP=0:Q=1:GOTO932
2050 IFR=54THENWD=1:GOTO3000
2055 IFR=63THENWW=1:GOTO3000
2800 IFR=55ANDD=1THENPRINT" A CH
ANDELIER DROPS ON YOUR HEAD
! YOU BLEED TO DEATH!":HP=0:Q=1:
GOTO932
2900 PRINT"NOTHING HAPPENS

```

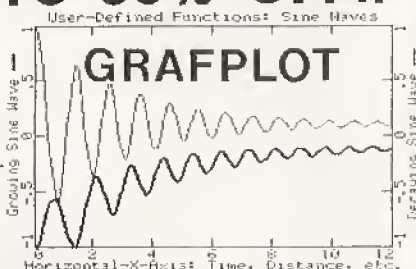
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```

3000 GOSUB10:D=0:GOTO200
4000 PRINT" AS YOU GO DOWN THE L
ADDER, YOU GET YOURSELF INTO A
TRAP!
4005 IFR=11THENA=RND(2)
4010 IFR=47THENA=RND(3)
4020 IFR=53THENA=RND(4)
4035 PRINT"YOU TAKE"A"UNITS OF D
AMAGE","TRYING TO ESCAPE":HP=HP-
A:PLAYD$
4050 IFR=11THENR=22
4060 IFR=47THENR=58
4070 IFR=53THENR=64
4080 GOTO3000
5000 PRINT" YOU ARE STUCK IN THE
ELEVATOR!":A=RND(3)
5010 PRINT"YOU TAKE"A"UNITS OF D
AMAGE","TRYING TO ESCAPE":HP=HP-
A:PLAYD$
5110 GOTO3000
5200 PRINT"YOU ARE BACK OUTSIDE!
,BUT YOU SAY TO YOURSELF, I MU
ST GET THOSE PRECIOUS JEWELS
":R=2:GOSUB1:GOTO200
5300 GOSUB6000:PRINT" YOU FALL I
NTO THE MOAT,AND GET EATEN ALIV
E BY CROCODILES!":HP=0:Q=1:R=2:G
OTO932
5400 GOSUB5600:IFN=-1THEN5410ELS
E5420

```

```

5410 OPEN"O",#N,A$:FORX=5TO57:PR
INT#N,M(X):NEXT:FORX=2TO50:PRINT
#N,P(X):NEXT:FORX=0TO69:PRINT#N,
O(X):NEXT:PRINT#N,R,HP,ML,SW,SP,
G,P,F,K,WD,WW,B37,R3,B7,B59,MO:C
LOSE#N:END
5420 OPEN"O",#N,A$:FORX=5TO57:WR
ITE#N,M(X):NEXT:FORX=2TO50:WRITE
#N,P(X):NEXT:FORX=0TO69:WRITE#N,
O(X):NEXT:WRITE#N,R,HP,ML,SW,SP,
G,P,F,K,WD,WW,B37,R3,B7,B59,MO:C
LOSE#N:END
5500 GOSUB5600
5510 OPEN"I",#N,A$:FORX=5TO57:IN
PUT#N,M(X):NEXT:FORX=2TO50:INPUT
#N,P(X):NEXT:FORX=0TO69:INPUT#N,
O(X):NEXT:INPUT#N,R,HP,ML,SW,SP,
G,P,F,K,WD,WW,B37,R3,B7,B59,MO:C
LOSE#N:A=1:GOTO210
5550 IFR=2THENR=3ELSEIFR=3THENR=
2
5560 GOTO200
5600 CLS:PRINT"TAPE,DISK,OR rETU
RN TO GAME
5601 GOSUB2:IFA$="R"THEN200ELSEI
FA$="T"THENN=-1ELSEIFA$="D"THENN
=1ELSE5601
5602 INPUT"MAY I ASK THE NAME OF
YOUR GAME":A$
5605 RETURN
5610 PRINTZ$"DOOR"R$Y$"OPENS":IF
WD=1THENPRINT" BUT A WALL IS BLO
CKING IT
5615 GOSUB1:RETURN
5620 IFWD=0THEN538
5621 PRINTZ$"LADDER"Y$"APPEARS":
KL=1:GOSUB1:RETURN
5630 IFHP<41THENA=RND(7)
5635 IFHP<31THENA=RND(5)

```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should so state when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

One-Liner Contest Winner . . .

Pretend you are playing golf and putt the ball into the cup. Enter numbers from -2 to 5 to take aim.

The listing:

```

10 S=30:Y=RND(188)+2:PMODE3:PCLS
:SCREEN1,0:CIRCLE(170,66),6,3,.5
:PAINT(170,66),3:FORI=1TOS:CIRCL
E(2,Y),3,2:NEXT:INPUTS:SCREEN1,0
:FORX=2TO173STEP7:CIRCLE(X,Y),3,
2:CIRCLE(X,Y),3,1:Y=Y-S:NEXT:IFY
<70ANDY>63THENPLAY"O2;L24;12;12;
O3;1;3;9;7;5":END:ELSERUN

```

Brad Lowe
Lafayette, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Simulations* and its companion *The Second Rainbow Simulations Tape*.)



Last month we visited a fast-food restaurant and worked on estimating expenses. This month, we ask the children to actually calculate the same expenses.

The program sends us back to our fast-food restaurant. Again, we see only part of the menu on our screen, where four food items are visible: a chicken sandwich, a salad, a soda and coffee. The computer chooses two of these items for each example, and the prices are randomly selected within a reasonable range of values.

Last month, the students were asked whether or not a certain random sum of money was enough for these two purchases. This month, they are asked for the correct amount of money they will need to make the combined purchase.

There are several alternatives in computing the amount. Using pencil and paper is the way that first comes to mind. If this program is used in a classroom, one or more students could work simultaneously at the blackboard on the same example. Alternatively, since there are only two values to be added, more advanced students could be taught to do the addition mentally. Lastly, a combination of two of the preceding might be a possibility. For instance, try the example first mentally and then check it on paper or the blackboard before entering the answer on the computer.

This program is very similar to last month's program. Lines 40 through 110 draw the menu and then select food prices for each example. The variables CH, SA, SD and CO determine the prices for each item. Line 130 sends the program temporarily to lines 250 through 300, where the two items highlighted in this example are chosen.

Line 150 asks the student to enter the total amount of the bill he or she must pay for the two items. Lines 160 through 190 calculate whether the response is correct. If it's incorrect, the correct answer will be displayed. The variable

Expense estimating, Part II

Restaurant Reckonings

By Steve Blyn
Rainbow Contributing Editor

FZ becomes the child's answer. The computer determines the correct answer by adding the variables AA and BB; AA represents the price of the food item selected and BB represents the price of the drink.

After studying the answer, the student presses the ENTER key to call up two more randomly selected food items and their prices.

After the student has gone through 10 trials, a scorecard is presented. Ten points are counted for each correct trial. Then the student is asked if he or she wants to try the program again. The program may now be ended by pressing the N key or started again by pressing the Y key.

We hope this program, in combination with last month's program, helps your students to become more adept at calculating purchases. □

The listing: SHOPPING

```

10 REM"FAST FOOD SHOPPING"
20 REM"STEVE BLYN, COMPUTER ISLAND, STATEN ISLAND, NY, 1988"
30 CLS:D=RND(-TIMER):IF CT=10 THEN 310
40 PRINT@3,"YOUR MENU";:PRINT@25,"#";CT+1;
50 FOR T=1056 TO 1087:POKET,243:NEXT:SOUND100,3
60 CH=120+RND(40):PRINT@98,"CHICKEN-$";:PRINTUSING"#.##";CH/100;
70 SA=70+RND(20):PRINT@162,"SALAD-$";:PRINTUSING"#.##";SA/100;
80 SD=32+RND(20):PRINT@114,"SODA-$";:PRINTUSING"#.##";SD/100;
90 CO=40+RND(20):PRINT@178,"COFFEE-$";:PRINTUSING"#.##";CO/100;
100 FOR T=1248 TO 1279
110 POKET,252:NEXTT:SOUND200,2
120 'PLAY"O4;L80;ABDBDBDBGG"
130 PRINT@256,"YOU ARE GOING TO BUY A "
140 GOSUB 250:PRINT@288,N1$;" AND A ";N2$
150 PRINT@352,"";:LINE INPUT"<ENTER> YOUR TOTAL BILL- $";FZ$
160 CT=CT+1:FF=VAL(FZ$)
170 FZ=INT((FF*100)+.9)
180 IF FZ=AA+BB THEN 200
190 IF FZ<>AA+BB THEN 200
200 RI=RI+1:PRINT@428,"CORRECT";

```

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.


```

210 FOR T=200TO255STEP11:SOUND T,
1:NEXTT:GOTO 230
220 PRINT@416,"SORRY,THE ANSWER
IS $";:PRINTUSING"#.##";(AA+BB)/
100:SOUND 10,3
230 PRINT@484,"PRESS <ENTER> TO
GO ON ";
240 EN$=INKEY$:IF EN$=CHR$(13) T
HEN 30 ELSE 240
250 RN=RND(2):RR=RND(2)
260 IF RN=1THENN1$="CHICKEN":AA=
CH
270 IF RN=2 THEN N1$="SALAD":AA=
SA
280 IF RR=1 THEN N2$="SODA":BB=S
D
290 IF RR=2 THEN N2$="COFFEE":BB
=CO
300 RETURN
310 CLS8:FOR T=1024TO1055:POKET,
214:PLAY"L100;G":NEXT:PRINT@37,"
HERE IS YOUR SCORECARD";
320 FOR T=1119TO1088STEP-1:POKET
,214:PLAY"L100;A":NEXTT
330 PRINT@202,"SCORE = ";10*RI;"
%";
340 FOR T=1344TO1375:POKET,214:P
LAY"L100;A":NEXT T
350 PRINT@416," ":PRINT@448," ":
PRINT@418,"DO YOU WANT TO PLAY A
GAIN? ";
360 EN$=INKEY$
370 IF EN$="Y" THEN RUN ELSE IF
EN$="N" THEN END ELSE 360

```

Two-Liner Contest Winner . . .

Many of us have felt frustration when our computer "makes an error." Here is one way to relieve those feelings.

The listing:

```

10 PMODE2,1:PCLS5:A$="BM80,130S6
C0D15R10U15L10D20R20U3M95,152BM8
0,132G5D3F5BM70,160R30D5L30U5D30
R5U16R20D30R5U20BM150,130R5D40L1
5U4E3R3U10H5U10E8H3U4E3R4F3D4G3"
:DRAW"XA$:BM153,140M125,160M120,
155M148,135M153,140"
20 DRAW"BM125,160H13G5F3E3F10E4"
:PMODE2,3:PCLS5:DRAW"XA$:BM148,1
40M127,118M130,115M153,135M148,1
40BM127,118E13H5G3F3G10F4":FORI=
0TO1STEP0:A=P*2+1:PMODE2,A:SCREE
N1,A:FORO=1TO500:NEXTO:P=-SGN(P)
+1:NEXTI

```

Arron Becwar
Mt. Sterling, WI

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

VCR Tapes Update

By Randy Mayfield

After my program, *VCR Tapes* (December 1987, Page 92), was submitted for publication, I purchased a new video cassette recorder. The digital counter display on the new model did not increment at the same rate as the old model. This made all counter records on the printouts and labels meaningless when using the new recorder. Since I did not envision this problem when I wrote the program, there was no provision in *VCR Tapes* to change an entry. I have a patch, however, and would like to share it with any readers who are experiencing the same problem.

The following changes and insertions will allow the user to change a title, tape number or counter number individually. The Change function is added as part of the Work in a File option and allows scrolling through an existing file to find the entry to change. Press the C key and you will be given four choices: 1) Change title; 2) Change tape number; 3) Change counter number; and 4) Return to work menu. Just enter the appropriate new data when prompted.

Make these changes to existing lines:

Line 110: after the word DELETE insert , CHANGE
Line 340: after the number 3 insert CHANGE":PRINT"4
Line 360: change the number 3 to 4
Line 370: change the first number 3 to 4
Line 460: remove the apostrophe and insert
L\$=MID\$(T\$(X),1,L):Q\$=MID\$(T\$(X),
L+1,3):T\$(X)=L\$+Q\$+R\$:GOTO 340
Line 920: before the ELSE 110 at the end of the line,
insert ELSE IF R\$="C" AND W=3 THEN 452

And add the following new lines:

```

375 IF W=3 THEN 451
451 CLS:X=X+1:PRINT"FIND ENTRY T
O change":PRINT:PRINT"UP-AR
ROW = SCROLL FORWARD":PRINT"
DOWN-ARROW = SCROLL BACK":PRINT
"C = CHANGE":PRINT"A
NY OTHER KEY = MAIN MENU":SOUND2
00,1:GOTO940
452 CLS:PRINT"change: ";MID$(T$(
X),1,L):PRINT:PRINT"1. CHANGE TI
TLE":PRINT"2. CHANGE TAPE NUMBER
":PRINT"3. CHANGE COUNTER NUMBER
":PRINT"4. WORK MENU":PRINT:PRIN
T"SELECT ONE":SOUND200,1
453 R$=INKEY$:IF R$="" THEN453
454 Q=VAL(R$):IF Q<1 OR Q>4 THEN
GOSUB1360:GOTO452
455 CLS:PRINT MID$(T$(X),1,L):PR
INT"TAPE NUMBER: ";MID$(T$(X)
,L+1,3):PRINT"COUNTER NUMBER: ";
RIGHT$(T$(X),4):ON Q GOTO 456,45
7,459,340
456 PRINT:PRINT"ENTER NEW TITLE:
":SOUND200,1:INPUT R$:L$=RIGHT$(
T$(X),7):T$(X)=R$+L$:GOTO340
457 PRINT:PRINT"ENTER NEW TAPE N
UMBER (###)":SOUND200,1:INPUT R
$:IF LEN(R$)<>3 THENGOSUB1360:G
OTO455
458 L$=MID$(T$(X),1,L):Q$=RIGHT$(
T$(X),4):T$(X)=L$+R$+Q$:GOTO340
459 PRINT:PRINT"ENTER NEW COUNTE
R NUMBER (###)":SOUND200,1:INP
UT R$:IF LEN(R$)<>4 THENGOSUB136
0:GOTO455

```


NOVICES NICHE



THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

Graphics

Life in a Fish Bowl

By Sandy Tadman

16K
ECB

Are you looking for a maintenance-free pet? Here's one for you — a blinking, bubble-burping fish. Not only do you not have to feed it, you can send it back to tape or disk whenever you're tired of it.

Electronic Aquarium is an exercise in simple animation using PMODE4 and nested loops to achieve the appearance of motion. If, after typing in and running the program you find you aren't satisfied with your pet, you can customize him (or her) — after all, you have to live with it.

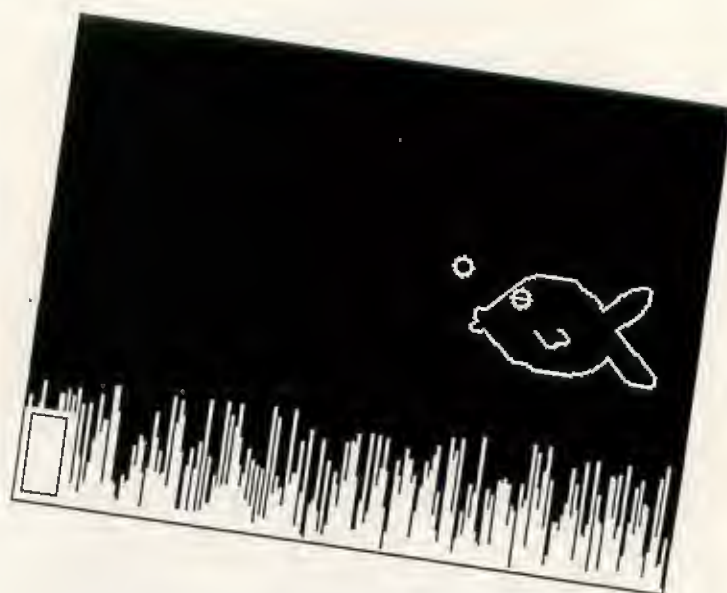
Try altering some of these variables. For example, the step rate of variable M (Line 15) controls the distance the fish moves; R determines where on the screen the fish, bubbles and eye are drawn; X controls the movement of the bubbles; and E controls the blinking of the eye. Alter the value Z in Line 22 to change how often the filter bubbles. Add color, if you own a CoCo 3. You can even change the shape of the fish as set in F\$ (Line 14).

The listing: AQUARIUM

```

4 '*****
5 '*      ELECTRONIC  AQUARIUM      *
6 '*                by                *
7 '*      Sandy Tadman              *
8 '*      (C) JULY 1987              *
9 '*****
10 PMODE 4:SCREEN 1,1:PCLS
11 R=160:E=R+24:E1=R+27
12 FORGR=1TO254:A=RND(50):LINE(G
R,190)-(GR,(140+A)),PSET:NEXTGR:
'weed
13 LINE(1,155)-(20,190),PSET,BF:

```



```

LINE(3,157)-(17,187),PRESET,B
14 F$="S7H1U2E1R2E8RERER9F2RFRFR
F2DFE3UERE2RRER2FD3GDGDG3LG2F5RF
5D2GL5HLH5DG3LGLGL2GL9HLHL3HLH3L
H3G1L2H1U1E1BR14F3R2EUR2EUH2L":'
fish
15 FOR M=168 TO 0 STEP-3
16 S$=STR$(M) + ",96"
17 DRAW"BM"+S$+"C1;XF$;":GOSUB 2
0
18 DRAW"BM"+S$+"C0;XF$;":NEXT M
19 GOTO 16
20 PLAY"T255L4B":FOR X=96 TO 0 S
TEP-20:CIRCLE(R,X),4:CIRCLE(E,85
),4,,.01:CIRCLE(E,85),4,0:

```



```

21 FORY=X+4ØTO ØSTEP-2Ø:CIRCLE(R
,Y),4,Ø:CIRCLE(E,85),4:NEXTY:'ey
e
22 Z=RND(3Ø):IF Z>28 GOSUB26
23 NEXT X:R=R-3:E=E-3:E1=E1-3:IF
R<=1Ø THEN END
24 CIRCLE(E1,85),4,Ø:CIRCLE(E1,8
5),4,Ø,.Ø1

```

```

25 RETURN
26 FOR B=151 TO Ø STEP-1Ø:CIRCLE
(5,B),5:NEXT B:'filter
27 PLAY"O1T25ØCDEFGABO2CDEFGABO3
CDEFG"
28 FORB=151 TO ØSTEP-1Ø:CIRCLE(5
,B),5,Ø:NEXT B
29 RETURN

```

Utilities

16K
ECB

A CoCo Pop-Up Calculator

By Frank Turner

A friend of mine is always extolling the virtues of his new Macintosh. I enjoy demonstrating that almost anything his high-priced computer can do, my CoCo can do, also. So, when I saw what a neat graphic calculator he had, I thought I would write a CoCo version for myself.

Calc draws a calculator on the screen and allows you to perform ordinary four-function mathematical operations (addition, subtraction, multiplication and division.) Just enter a number, an "operator" (+, -, *, /), another number and the "equals" sign (=), and your answer will be displayed on the calculator screen.

Press C to clear the display for another operation. If you are finished, press the space bar, and the calculator will erase itself from the screen. As programmed, pressing the space bar also ends the program. But you can easily adapt *Calc* to become a subroutine of one of your larger programs with an INPUT or INKEY loop. In fact, the numbering of the program starts at Line 5000 to aid you in its transferal to a subroutine.

Just imagine — you're in the middle of a database program and need to do some calculations on your raw data. You won't have to waste time away from the keyboard hunting for your pocket calculator; you can quickly call up *Calc*, get your answer and return to the database where you left off!

Note: If you are using *Calc* as a subroutine, make sure that its variable names are not duplicated in the main program. Also, the DIM statement ought to go at the beginning of the main program.

The values required for the calculator display, or, in fact, any other display you may desire to construct, can be looked up in tables. In practice, it is easier to let the computer do the work. Just type in and run this one-line program:

```

1000 FORX=1TO128:PRINT@170,X:="=":"POKE1200,X
:FORY=1TO200:NEXTY:NEXTX

```

This mini-program lets you pick out the correct values to use to generate the character.

The listing: CALC

```

5000 REM*****
*
5001 REM* CALCULATOR SUBROUTINE
*
5002 REM*****
*
5003 DIMP(9Ø):CF$="#####.#"

```

```

5004 DATA129,131,131,131,131,131
,131,131,131,130,133,96,96,96,96
,96,96,96,96,138,132,14Ø,14Ø,14Ø
,14Ø,14Ø,14Ø,14Ø,14Ø,136,32,49,1
28,5Ø,32,32,51,32,52,32
5005 DATA32,53,32,54,32,32,55,32
,56,32,32,57,32,48,32,32,32,32,6
1,32
5006 DATA32,43,32,45,32,32,47,32
,42,32
5007 DATA32,32,32,32,32,32,32,32
,32,32,3,1,12,3,21,12,1,2Ø,15,18
5008 Y=992:A=Ø
5009 FORX=Y+2Ø8 TO Y+217:P(A)=PE
EK(X):READXX:POKEX,XX
5010 A=A+1:NEXTX
5011 Y=Y+32:IFY>1279 GOTO 5012 E
LSE GOTO5009
5012 Y=Ø:B$="":D$="":O$="":C$=""
5013 C$=INKEY$:IF C$=""THEN5013
5014 PRINT@2Ø9+Y,C$;:B$=B$+C$:Y=
Y+1
5015 IF C$="*" OR C$="/" OR C$="
+" OR C$="-" THEN PRINT@2Ø9,"
"C$;:O$=C$:GOTO 5017
5016 GOTO5013
5017 Y=Ø
5018 C$=INKEY$:IFC$=""THEN5018
5019 PRINT@2Ø9+Y,C$;:D$=D$+C$:Y=
Y+1
5020 IF C$="=" AND O$="*" THEN A
=(VAL(B$))*(VAL(D$)):GOTO5025
5021 IF C$="=" AND O$="/" THEN A
=(VAL(B$))/(VAL(D$)):GOTO5025
5022 IF C$="=" AND O$="+" THEN A
=(VAL(B$)+(VAL(D$)):GOTO5025
5023 IF C$="=" AND O$="-" THEN A
=(VAL(B$)-(VAL(D$)):GOTO5025
5024 GOTO5018
5025 PRINT@2Ø9,USINGCF$;A;
5026 C$=INKEY$:IFC$=""THEN5026
5027 IFC$="C" THEN PRINT@2Ø9,"
";:GOTO 5012
5028 IFC$=CHR$(32) GOTO503Ø
5029 GOTO 5026
5030 Y=992:A=Ø
5031 FORX=Y+2Ø8 TO Y+217:POKEX,P
(A)
5032 A=A+1:NEXTX
5033 Y=Y+32:IFY>1279 THEN END EL
SE GOTO 5031

```


The ABCs of Organization

By Andre Needham

This short program alphabetizes the directory entries on your disks, which makes keeping track of programs much easier.

To use *DIR Alpha*, just put the disk to be alphabetized in Drive 0 and run the program. That's all there is to it!

The listing: DIRALPHA

```
10 CLEAR1100:DIMDS(68):CLS:PRINT
"DIRECTORY ALPHABETIZER":PRINT
20 INPUT"PRESS ENTER TO START";A$
30 PRINT"ONE MOMENT...":Z=0:FORT=3 TO 11:A$="":B$="":DSKID$,17,T,A$,B$
40 FORQ=1 TO 97 STEP32:C$=MID$(A$,Q,16):IFASC(LEFT$(C$,1))=255 THEN130
50 IFASC(LEFT$(C$,1))=0 THEN70
60 D$(Z)=C$:Z=Z+1
70 NEXT
80 FORQ=1 TO 97 STEP32:C$=MID$(B$,Q,16):IFASC(LEFT$(C$,1))=255 THEN130
EN130
```

16K
Disk

```
90 IFASC(LEFT$(C$,1))=0 THEN110
100 D$(Z)=C$:Z=Z+1
110 NEXT
120 NEXT
130 Z=Z-1:IFZ=0 THENPRINT"ONLY ONE FILE ON DISK-NO NEED TO ALPHABETIZE":END
140 FORT=0 TO Z-1:FOR S=T+1 TO Z
150 IFD$(S)<D$(T) THEN C$=D$(S):D$(S)=D$(T):D$(T)=C$
160 NEXTS,T
170 N$=STRING$(16,0):FORT=0 TO Z+3 STEP8:A$="":B$=""
180 FORU=0 TO 3:IFT+U<=Z THEN A$=A$+D$(T+U)+N$ ELSE 230
190 NEXT:FORU=4 TO 7:IFT+U<=Z THEN B$=B$+D$(T+U)+N$ ELSE240
200 NEXT
210 DSKO$,17,T/8+3,A$,B$:IFT+U<=Z THENNEXT
220 IFT/8+4 <18 THENA$=STRING$(128,255):B$=A$:DSKO$,17,T/8+4,A$,B$
225 END
230 A$=A$+STRING$(128-LEN(A$),255)
240 B$=B$+STRING$(128-LEN(B$),255):GOTO210
```

Hard Copy Your Directory

By Jim Knoppow

If you're as tired as I am of rooting through a pile of disks in order to find a particular file, here comes some rapid relief.

Pop a roll of 3 1/2-by-1 5/16 inch labels into your Epson-compatible printer, run *DIR Print*, and — *voila!* — out comes a neatly printed label showing every entry in the directory. Each label will hold up to 36 names and extensions.

In my filing system, I place my disks into categories (e.g., graphics, games, utilities, word processing text files, etc.). When a disk is reasonably full, it goes into a permanent filing system, a backup is made, and two *DIR Print* labels are printed — one for the main disks and one for the backup.

I also like to run *DIR Print* using ordinary computer paper (instead of labels) so that I can have an index of all my programs on one page.

All the printer codes are commented in the listing; so, if your printer is not Epson-compatible, you should be able to substitute the correct codes. Incidentally, until you reset the CoCo, directories will be printed to the screen in two columns for easier reading.

On some printers, the code in Line 40 that selects condensed type may be canceled by the code in Line 50, which selects elite type. You may need to put a REM marker at the beginning of Line 50. On my Epson LX 86 printer, the four columns of directory information fit on the label with plenty of room. On other printers, such as the Epson FX, however, the condensed mode is larger, and fitting the columns on a standard label is a tight squeeze, requiring a few trial runs. If you have problems, please feel free to contact me at 15355 SE 307 St., Kent, WA 98042.

16K
Disk

ACCOUNT BAS	ANIMATE BAS	AUTODIAL BAS	BARREL BAS
BEEZAP BAS	BIOCHART BAS	BLASTER BAS	COCODRAW BAS
COCOKEYS BAS	DESKTOPL BAS	DIRALPHA BAS	DIRPRINT BAS
ENVELOPE BAS	FISEAGLE BAS	FIFTHDIM BAS	FOOTBALL BAS
FORHATTR BAS	GRAPH BAS	HANDMAN BAS	JETPLANE BAS
LE LUTIN BAS	MAPSCALE BAS	METRONOME BAS	MONEYJAR BAS
PAYROLL BAS	RESCUE BAS	ROADSKIL BAS	ROBOFLIP BAS
SCANDMP BAS	SPELDOWN BAS	TAXINFO BAS	USETOWN BAS
VACATION BAS	VARIABLE BAS	WDSERACH BAS	YARDBALE BAS

Editor's Note: For best results, use DIR Print and DIR Alpha, the preceding program, in tandem — you will be able to locate any file in a matter of seconds.

The listing: DIRPRINT

```
10 POKE150,1 'SETS BAUD RATE TO 9600-TO CHANGE THIS COCO TO PRINTER COMMUNICATION SPEED SEE YOUR COCO MANUAL.
20 PRINT#-2,CHR$(27);CHR$(51);CHR$(18)'LINE SPACING (1/12")
30 PRINT#-2,CHR$(27);CHR$(83);CHR$(0)'SELECT SUPERSCRIPT
40 PRINT#-2,CHR$(27);CHR$(15)'SELECT CONDENSED
50 PRINT#-2,CHR$(27);CHR$(77)'SELECT ELITE
60 FORX=3072 TO 3134:READA$:POKEX,VAL("&H"+A$):NEXT
70 DATA 1A,50,8E,80,00
80 DATA A6,84,B7,FF,DF
90 DATA A7,80,8C,E0,00
100 DATA 27,05,B7,FF,DE
110 DATA 20,EF,1C,AF,86
120 DATA 12,B7,CC,EC,B7
130 DATA CC,ED,B7,CC,EE
```



```

14Ø DATA B7,CD,ØØ,B7,CD
15Ø DATA Ø1,B7,CD,Ø2,B7
16Ø DATA CD,Ø3,B7,CD,Ø4
17Ø DATA B7,CD,Ø5,B7,CD
18Ø DATA 18,B7,CD,19,B7
19Ø DATA CD,1A,39
2ØØ EXEC3Ø72
21Ø PRINT#-2,CHR$(27);CHR$(81);C
HR$(64)'SELECT 64 CHAR/LINE
22Ø CLS
23Ø POKE 111,Ø
24Ø PRINT"INSERT DISK WHOSE DIRE
CTORY YOU WISH TO PRINT"
25Ø PRINT:PRINT"POSITION LABEL I

```

```

N PRINTER"
26Ø PRINT:INPUT"HIT <ENTER> TO P
RINT";Z
27Ø CLS
28Ø POKE111,254:DIR
29Ø PRINT#-2,CHR$(13)'CARRIAGE R
ETURN
3ØØ INPUT" DO YOU WANT TO PRINT
ANOTHER, <YES OR NO>";A$
31Ø B$=LEFT$(A$,1)
32Ø IF B$="N"THENEND
33Ø IF B$="Y"THEN22Ø
34Ø GOTO3ØØ

```

Reading Word Processing Files

By Chris Steele

4K

This program allows you to read a text file without having to load a word processor. After running, enter the filename with its proper extension. *ASCII Read* asks if you want the file output to the screen or to the printer, giving you a selection of printer baud rates to choose from. Note: If the file contains embedded control codes, the program might not work.

The listing: ASCIREAD

```

5 '* THE ASCII SCREEN MACHINE *
6 '* ASCIREAD BY CHRIS STEELE *
1Ø CLS:PRINTSTRING$(32,14Ø);:PRI
NT" The Ascii Print Utility (c)8
7":PRINTSTRING$(32,14Ø);:PRINT"P
rog Created by: Chris Steele"
15 PRINT:LINEINPUT"[ENTER] textn
ame/EXT:";FILE$:IFFILE$=""THEN15
ELSEPRINT:PRINT"Would you like t
o output file:";PRINT"[1] SCREEN
[2] PRINTER":LINEINPUT"Enter
Choice:";CH$:IFCH$="1"THEN2Ø ELS
E IFCH$="2"THEN45
2Ø OPEN"I",#1,FILE$
21 CLS:PRINT"[Press <S> to stop
scrolling]":FORX=1TO5ØØ:NEXTX
25 ST=Ø
3Ø ST=ST+1:IFST>6ØTHEN4Ø
35 IFINKEY$="S"ORINKEY$="s"THEN4
ØELSEIFNOTEOF(1)THENLINEINPUT#1,
TEXT$:PRINTTEXT$:GOTO35 ELSE CLO
SE:FORX=1TO5ØØ:NEXTX:PRINT"[End
of file]":GOTO1Ø
4Ø PRINT:LINEINPUT"<S>top or <C
>ontinue]:";C$:IFC$="S"ORC$="s"TH
ENCLOSE#1:PRINT"* aborted *":GO
TO1ØELSE25

```

```

45 PRINT:PRINT"Following Baud Ra
te to choose:";PRINT"[1] 3ØØ BAU
D [2] 6ØØ BAUD":PRINT"[3] 12ØØ
BAUD [4] 24ØØ BAUD":PRINT"[5]
48ØØ BAUD [6] 96ØØ BAUD":PRINT:
INPUT"Enter Baud#";BD$:IFBD$=""TH
EN45
5Ø IFBD$="1"THENPOKE15Ø,18Ø:GOTO
9Ø
55 IFBD$="2"THENPOKE15Ø,87:GOTO9
Ø
6Ø IFBD$="3"THENPOKE15Ø,41:GOTO9
Ø
65 IFBD$="4"THENPOKE15Ø,18:GOTO9
Ø
7Ø IFBD$="5"THENPOKE15Ø,7:GOTO9Ø
75 IFBD$="6"THENPOKE15Ø,1:GOTO9Ø
8Ø GOTO45
9Ø IFPEEK(&HFF22)<>4THENPRINT:PR
INT"Printer is not ready,turn it
on":PRINT:LINEINPUT"Press [ENTE
R] when ready:";ZZ$:IFZZ$=""THEN
94ELSE9Ø
94 OPEN"I",#1,FILE$
95 IFNOTEOF(1)THENLINEINPUT#1,TE
XT$:PRINT#-2,TEXT$:GOTO95 ELSE C
LOSE#1:PRINT:PRINT"[Printing is
complete]":FORX=1TO5ØØ:NEXTX:GOT
O5

```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type SEND and address to: EDITORS.

★ Current Record Holder

● Shutout

ADVANCED STAR TRENCH (THE RAINBOW, 7/86)

4,300 ★Jeffrey Warren, Waynesville, NC
3,975 David Schaller, Clarkson, WA
3,960 Maurice MacGarvey, Dawson Creek,
British Columbia

3,960 Robbi Smith, Helena, HI
3,800 Shaw Muniz, Los Angeles, CA
2,600 John Fredericks, Kalkaska, MI
2,450 Blain Jamieson, Kingston, Ontario

BEE ZAPPER (THE RAINBOW, 9/87)

9,650 ★Benoit Landry, Drummondville,
Quebec

BOUNCING BOULDERS (Diecom)

9,318 ★Skip Today, East Lyme, CT
8,859 Darrell Gilpin, Norwalk, CA
7,448 Philip Manwarren, Harrington, ME
3,994 Louis Bouchard, Gatineau, Quebec
1,561 Lisa Nantel, L'Acadie, Quebec

BREWMASTER (NOVASOFT)

133,575 ★Melody Webb, Lakeport, CA
126,925 Matthew Leitman, Beaconsfield,
Quebec

BUBBLE WARS (THE RAINBOW, 2/86)

52,100 ★Daniel Cecil, Bardstown, KY
42,800 Blain Jamieson, Kingston, Ontario
41,400 Becky Rumpel, Arcadia, WI
26,350 Jason Ebbeling, Berkshire, MA

BUZZARD BAIT (Tom Mix)

22,931,850 ★Skip Today, East Lyme, CT
763,550 Geran Stalker, Rivordalo, GA

CALIXTO ISLAND (Mark Data)

196 ★Augusto Voysest, Lima, Peru

CANYON CLIMBER (Radio Shack)

1,627,500 ★Matthew Fumich, Munford, TN
178,200 Darren King, Yorkton, Saskatchewan
169,000 Gregory Speer, Emporia, KS
159,200 Upton Thomas, Arnold, MD
150,200 Brian Lewis, Baltimore, MD
141,400 Michael Petry, Kansas, AL
135,600 Eric Rose, Grand Coulee, WA
128,000 Tony Bacon, Mt. Vernon, IN
125,600 Tim Lang, Downieville, CA
125,000 Tony Fortino, Tacoma, WA

CASTLE (THE RAINBOW, 6/86)

326,352 ★Richard Donnell, Penns Grove, NJ
228,622 John Broussard Jr., Alexandria, LA
202,659 Brendan Powell, La Grande, OR
116,606 Darryn Bearisto, New Carlisle,
Quebec

93,672 Maurice MacGarvey, Dawson Creek,
British Columbia

CLOWNS & BALLOONS (Radio Shack)

688,960 ★Faye Keefer, Augusta, GA
70,180 Charles Andrews, Delta Jct, AK
36,650 Melody Webb, Lakeport, CA

COLOR POKER (The Rainbow, 4/83)

4,128,600 ★Earl Foster, Lynchburg, VA

CRYSTLE CASTLES (ThunderVision)

554,979 ★Patrick Martel, Laval, Quebec
60,107 Alphonse Brown, Houston, TX

DALLAS QUEST (Radio Shack)

81 ★Brad Wilson, Lithia Springs, GA
85 David and Shirley Johnson, Leicester,
NC

86 Roy Grant, Toledo, OH
86 Melanie Moor, Florence, AL
86 Paul Summers, Orange Park, FL

87 Douglas Bell, Duncan, OK
89 Chris Piche, White Rock,
British Columbia

89 Milan Parekh, Fullerton, CA
89 Andrew Urquhart, Metairie, LA
89 Steve Zemalis, Howell, MI

91 John Semonin, Akron, OH

DECATHALON (Spectral Associates)

7,216 ★Marlin Parada, Arcadia, CA

DEF MOV (THE RAINBOW, 1/87)

30,253 ★Benoit Landry, Drummondville,
Quebec

DEMON ATTACK (Imagio)

72,410 ★Glenn Hodgson, Aberdeenshire,
Scotland
40,435 Upton Thomas, Arnold, MD

28,780 Daniel Streidt, Cairo, Egypt
4,960 Laurence Clemon, Sacramento, CA

DESERT RIDER (Radio Shack)

50,797 ★Patrick Devitt, Lombard, IL
26,125 Ryan Grady, Newbury Park, CA

DEVIL ASSAULT (Tom Mix)

1,866,100 ★Stephane Martel, Laval, Quebec
623,550 Dale Krueger, Maple Ridge,
British Columbia

75,000 Blake Cadmus, Reading, PA

DOWNLAND (Radio Shack)

99,980 ★Danny Winett, Rome, NY
99,985 Karl Gulliford, Summerville, SC
97,740 Stephane Deshaies, Beloeil, Quebec
89,490 Neil Edge, Williston, FL
77,254 Tom Audas, Fremont, CA
73,346 Jean-Francois Morin, Loretteville,
Quebec

70,142 Chris Goodman, Baltimore, MD
68,142 Cooper Valentin, Vavenby,
British Columbia

67,721 Keith Yampanis, Jallrey, NH
62,442 Eddie Lawrence, Pasadena,
Newfoundland

55,300 Palrico Gonzalez, Buenos Aires,
Argentina

49,500 Danny Perkins, Clifton Forge, VA
43,502 Mike Ellis, Charlotte, MI

41,896 Antonio Hidalgo, San Jose,
Costa Rica

40,360 Jesse Binns, Phoenix, AZ
34,424 Andrea Mayfield, Melbourne, FL

25,147 Timothy O'Neal, Commerce, TX
21,527 Scott Godfrey, Nashua, NH

19,835 Christopher Heston, Louisville, KY
18,251 Sam DiCerce, Willowick, OH

18,103 Sarah Van Oieghem, Taylor Ridge, IL
17,120 Kay McCluskey, Remsen, NY

DRAGON BLADE (Prickly-Pear)

69 ★Jason Damron, Folsom, CA

DRAGON FIRE (Radio Shack)

146,325 ★Stephane Martel, Laval, Quebec
5,561 Chris Lorenz, Kiester, MN

ESCAPE 2012 (Computerware)

202 ★Roy Grant, Toledo, OH

FIRE COPTER (Adventure International)

126,420 ★Brad Wilson, Lithia Springs, GA
64,710 Phillip Gregory, Moultrie, GA

FIRESTORM (THE RAINBOW, 1/86)

22,505 ★Chad Presley, Lulesand,
Saskatchewan

8,910 Stephane Martel, Laval, Quebec
5,680 Kathy Rumpel, Arcadia, WI

3,760 Rick Bevers, Bloomfield, MN
3,505 Blake Cadmus, Reading, PA

GALACTIC ATTACK (Radio Shack)

26,370 ★Jeff Remick, Warren, MI

9,930 Daniel Streidt, Cairo, Egypt

GALAGON (Spectral Associates)

328,820 ★Bernard Burke, Lee's Summit, MO
255,080 Jason Clough, Houston, TX

249,960 Matthew Fumich, Munford, TN
169,410 Danny Dunne, Pittsfield, NH
149,520 Vernon Johnson III, Parkville, MD

116,280 Scott Jamison, Billerica, MA
116,000 Micah Clough, Houston, TX

GALAX ATTACK (Spectral Associates)

236,350 ★Corey Leopold, Nada, TX

28,300 Augusto Voysest, Lima, Peru

GALLOPING GAMBLERS (THE RAINBOW, 12/85)

3,427,660 ★Sean Lair, Ewing, MO

GANTELET (Diecom Products)

23,643,720 ★Geran Stalker, Rivordalo, GA
20,921,490 Randall Edwards, Dunlap, KS

10,222,940 Clinton Morell, Sacramento, CA
10,020,500 Ken Hubbard, Madison, WI

7,493,340 Stirling Dell, Dundalk, Ontario
2,626,950 Jonathon Ross, Pocomoke City, MD

2,512,620 Jason Steele, Pensacola, FL
2,312,640 Rory Kostman, Hershey, NE

2,115,790 Jerry Honigman, Waggoner, IL
2,011,200 Jerry Colbert, Bakersfield, CA

1,224,190 Jonathan Wanagel, Freeville, NY
1,108,750 Robert Fox, Dover, OH

1,094,280 Donnie Pearson, Arvada, CO
1,081,530 Michael Wallace, Bronx, NY

1,025,900 John Hotaling, Duaneburg, NY
1,016,050 Edward Swatek, Chicago, IL

933,740 Yvan Langlois, Laval, Quebec
932,660 Brian Hunter, South Berwick, ME

787,780 Brad Wilson, Lithia Springs, GA
685,840 Karen Jessen, Cleveland, OH

667,390 Robbie Smith, Helena, HI
456,220 Scott Jamison, Billerica, MA

410,868 Billy Helmick, Independence, KY
79,570 David Gordon, Pierre, SD

GHANA BWANA (Radio Shack)

523,080 ★Joseph Delaney, Augusta, GA
457,520 Georgina Haynes, Nice, CA

252,840 Edward Rocha, Cobleskill, NY

GRABBER (Tom Mix)

432,650 ★Matthew Fumich, Munford, TN

HALL OF THE KING (Prickly-Pear)

107 ★Joshua Wanagel, Freeville, NY

HITCHHIKER'S GUIDE TO THE GALAXY (Infocom)

400/510 ★Brad Wilson, Lithia Springs, GA

HOME ROW BOMBER (THE RAINBOW, 1/87)

6,384 ★Timothy Hennon, Highland, IN

SCOREBOARD

3,372	Benoit Landry, Drummondville, Quebec	PINBALL (<i>Radio Shack</i>)	399,350	★Troy Stoll, Washington, IN	SUCCESS MANSION (THE RAINBOW, 1/87)	13/13	★Dave Alessi, Iselin, NJ
INFIDEL (<i>Infocom</i>)			213,300	Patrick Martel, Laval, Quebec	SUPER ROOTER (THE RAINBOW, 5/86)	15,180	★Richard Donnell, Penns Grove, NJ
400/326	★Brad Wilson, Lithia Springs, GA		142,400	Thomas Payton, Anderson, SC		11,090	Frederick Lajoie, Nova Scotia, Canada
JOKER POKER (THE RAINBOW, 3/87)						3,910	Daniel Bradford, Birmingham, AL
2,793,285	★Blain Jamieson, Kingston, Ontario					303,600	★Tim Hennon, Highland, IN
13,377	Jason Ebbeling, Berkshire, MA	PITFALL II (<i>Activision</i>)	199,000	★Sean Noonan, Green Bay, WI	TEMPLE OF FOM (<i>Radio Shack</i>)	132	★Matthew Fumich, Munford, TN
11,000	Frankie DiGiovanni, Olney, MD	121,680	54	Robert Wells, Topeka, KS	TREKBOER (<i>Mark Data</i>)	123	Roy Grant, Toledo, OH
JUNIOR'S REVENGE (<i>Computerware</i>)					TUT'S TUMB (<i>Mark Data</i>)	118,720	★Reina Roy, Carleton, Quebec
2,503,000	★Stephane Martel, Laval, Quebec	PITSTOP II (<i>Epyx</i>)	54	★Rusly Breitbach, Rickardsville, IA	74,780	Mack Haynes, Nice, CA	
257,600	Keith Cohen, Rocky Mount, NC	54	54	★Jeff Coburn, Easton, PA	72,000	Chad Presley, Luseland, Saskatchewan	
THE JUNGLE (THE RAINBOW, 8/84)		54	54	★Walter Hearne, Pensacola, FL	60,020	Don Siler, Muncie, IN	
432,223	★Michael Nystrom, West Bridgewater, MA	54	51	★Jeff Szczerba, Sturtevant, WI	45,000	Blake Cadmus, Reading, PA	
JUNKFOOD (THE RAINBOW, 11/84)		54	49	★Sean Noonan, Green Bay, WI	VARLOC (<i>Radio Shack</i>)	2,032	★Tony Harbin, Cullman, AL
18,650	★Daniel Streidl, Cairo, Egypt	51	9	Brad Wilson, Lithia Springs, GA	2,032	★Edward Rocha, Cobleskill, NY	
KARATE (<i>Decom Products</i>)		49		Christian Grenier, Valleyfield, Quebec	2,008	Philip Puffinburger, Winchester, VA	
11,600	★Jonathon Ross, Pocomoke City, MD	9		Randy Venable, Coat City, WV	1,995	Denise Rowan, Minneapolis, MN	
6,300	David Darling, Longlac, Ontario	PLANETFALL (<i>Infocom</i>)	400/210	Laundre Clemon, Sacramento, CA	1,991	Ryan Grady, Newbury Park, CA	
THE KING (<i>Tom Mix</i>)		POPCORN (<i>Radio Shack</i>)	94,470	★Brad Wilson, Lithia Springs, GA	1,988	Randall Edwards, Dunlap, KS	
3,824,280	★Andre Grenier, Quebec, Canada	25,850		★Patrick Martel, Laval, Quebec	1,975	Bernard Florence, Croydon, Australia	
22,400	Spencer Metcalf, Longview, TX			Matthew Leitman, Beaconsfield, Quebec	18,813	★Talib Khan, Bronx, NY	
KORONIS RIFT (<i>Epyx</i>)					11,902	Martha James, Swarthmore, PA	
186,710	★Tony Harbin, Cullman, AL	PYRAMID (<i>Radio Shack</i>)	220	★Jason Ebbeling, Berkshire, MA	10,489	Karl Gulliford, Summerville, SC	
184,180	Russell Johnson, Sarnia, Ontario	PYRAMID 2000 (<i>Radio Shack</i>)	100	★Peter Antonopoulos, Toa Baja, Puerto Rico	6,294	Pat O'Neill, Nepean, Ontario	
184,120	John Farrar, Lebanon, TN				4,643	Martha James, Swarthmore, PA	
133,990	Paul Blessing, Spring, TX	QUIX (<i>Tom Mix</i>)	8,407,772	★John Haldane, Tempe, AZ	3,285	Richard Donnell, Penns Grove, NJ	
84,830	Thomas Beruheimer, Yorba, PA	1,404,000		Curtis Goodson, Sao Paulo, Brazil	100/276	★Tommy Crouser, Dunbar, WV	
84,070	David Spalding, Galena Park, TX	1,003,104		Elisa Goodson, Sao Paulo, Brazil	100/483	Rick & Brenda Stump, Laureldale, PA	
33,900	Steven Moreno, Stockton, CA	326,192		Martin Parada, Arcadia, CA	210	Paul Maxwell, Vancouver, British Columbia	
13,210	David Ewing, Deatsville, AL	205,335		John Hotelling, Duaneburg, NY	WARP FACTOR X (<i>Prickly-Pear</i>)	5,829,559	★Doug Lule, Clymer, PA
LUNAR RESCUE (THE RAINBOW, 8/87)		104,034		Christopher Conley, North Attleboro, MA	WISHBRINGER (<i>Infocom</i>)	400/201	★Brad Wilson, Lithia Springs, GA
113,579	★Jeff Remick, Warren, MI	RESCUE ON FRACTALUS (<i>Epyx</i>)	270,000	★Russell Johnson, Sarnia, Ontario	WRESTLE MANIAC (<i>Decom</i>)	956,971	★Marc Reiter, Cincinnati, OH
LUNCHTIME (<i>Novasoft</i>)		99,967		Gary Sebastian, Hazel Park, MI	546,315	Louis Bouchard, Gatineau, Quebec	
444,325	★Richard Donnell, Penns Grove, NJ	88,445		James Andrews, Kissimmee, FL	45,483	Tony Bacon, Mt. Vernon, IN	
136,925	Alphonse Brown, Houston, TX	48,445		Steven Moreno, Stockton, CA	39,086	Billy Helmick, Independence, KY	
103,350	George Ramos, Lakeport, CA	RETURN OF JUNIOR'S REVENGE (<i>Colorware</i>)	1,792,800	★Chad Presley, Luseland, Saskatchewan	26,599	Jonathon Ross, Pocomoke City, MD	
55,550	Richard Deane, Chicago, IL	RETURN OF THE JET-I (<i>ThunderVision</i>)	309,250	★Melody Webb, Lakeport, CA	ZAKSUND (<i>Elite Software</i>)	357,550	★Martin Parada, Arcadia, CA
42,025	Steve Place, Webster, NY	ROGUE (<i>Epyx</i>)	27,542	★Melanie Lapoint, Fitchburg, MA	39,950	Walter Hearne, Pensacola, FL	
THE MARTIAN CRYPT (<i>NOVASOFT</i>)		21,682		Paul Blessing, Spring, TX	ZAXXON (<i>Datasoft</i>)	2,061,000	★Byron Alford, Raytown, MO
32	★Matthew Fumich, Munford, TN	17,851		Yvan Langlois, Laval, Quebec	1,950,000	Blake Cadmus, Reading, PA	
MEGA-BUG (<i>Radio Shack</i>)		8,812		Allen Houk, San Diego, CA	1,300,500	Dan Brown, Pittsford, NY	
5,172	★Jason Ebbeling, Berkshire, MA	6,576		Kirk Marshall, Westport, MA	1,100,600	Andrew Urquhart, Metairie, LA	
MISSION: F-16 ASSAULT (<i>Decom Products</i>)		6,204		Scot Drew, Ottawa, OH	253,400	Bob Dewitt, Blue Island, IL	
468,750	★Karen Jessen, Cleveland, OH	5,679		David Spalding, Galena Park, TX	170,600	Matthew Yarrows, East Hampton, MA	
355,570	Stirling Dell, Dundalk, Ontario	5,369		John Moore, Ottawa, OH	163,700	Daniel Bradford, Birmingham, AL	
318,160	Jeremy Pruski, Sandwich, IL	5,274		Reiland Brumfield, LaJolla, CA	119,600	Daniel Streidl, Cairo, Egypt	
137,920	Mike Grant, Fresno, CA	4,719		Mary Calcott, LaJolla, CA	118,100	Upton Thomas, Arnold, MD	
127,550	Michael Heitz, Chicago, IL	SAILOR MAN (<i>Tom Mix</i>)	332,600	★Jeremy Carter, Spring Lake Park, MN	111,400	Jeff Miller, Bronson, MI	
120,670	Vernon Johnson III, Parkville, MD	332,600		Patrick Devitt, Lombard, IL	87,200	Tim Lang, Downieville, CA	
58,530	Chris Wright, New Albany, IN	287,200		163,700	83,700	David Darling, Longlac, Ontario	
MOON HOPPER (<i>Computerware</i>)		SANDS OF EGYPT (<i>Radio Shack</i>)	82	★Edward Rocha, Cobleskill, NY	81,000	David Anderson, Midlothian, VA	
103,840	★Alphonse Brown, Houston, TX	82		Roy Grant, Toledo, OH	ZONX (THE RAINBOW, 10/85)	6,500	★Daniel Streidl, Cairo, Egypt
100,990	George Ramos, Lakeport, CA	86		Neil Haupt, Elyria, OH	ZORK I (<i>Infocom</i>)	400/720	★Brad Wilson, Lithia Springs, GA
51,870	Martin Kertz, Forrest City, AR	87		★Jason Ebbeling, Berkshire, MA	ZUES (<i>Aardvark</i>)	3,380	★Martin Kertz, Forrest City, AR
MUNCHKIN BLASTER (THE RAINBOW, 8/87)		SAUCER DEFENSE (THE RAINBOW, 4/87)	30,900	★Jason Ebbeling, Berkshire, MA			
9,000	★Benoit Landry, Drummondville, Quebec	SHOOT 'N RANGE (THE RAINBOW, 8/87)	5,433	★Benoit Landry, Drummondville, Quebec			
7,240	Jelf Remick, Warren, MI	SHORT-TERM MEMORY TEST (THE RAINBOW, 12/85)	20	★Brian and Harold Matherne, Grelna, LA			
ONE-ON-ONE (<i>Radio Shack</i>)							
1,276-0	★Jonathan Dorris, Indianapolis, IN	SPEEDSTER (THE RAINBOW, 8/87)	4,710	★Andrea Reelitz, Greenville, IL			
1,210-0	★Gregg Thompson, Chesterfield, VA	4,710	3,350	★Jamie Stoner, Mt. Union, PA			
1,204-0	★Chad Johnson, Benton, AR	3,350					
1,180-0	★Mark Lang, Downieville, CA	STELLAR LIFE-LINE (<i>Radio Shack</i>)	629,000	★Steven Smith, Matthews, NC			
1,132-23	Dan Liffmann, Andover, MA		114,620	Martinez Domingo, Miami, FL			
1,122-4	Jason Ebbeling, Berkshire, MA						
PAPER ROUTE (<i>Decom Products</i>)							
1,120,350	★Neil Haupt, Elyria, OH						
1,059,350	David Kauffman, South Haven, MI						
830,950	Christopher Darden, Woodson Terrace, MO						
720,560	Konnie Siewierski, Schaumburg, IL						
531,600	Larry Shelton, Marion, IL						
25,700	Patrick Devitt, Lombard, IL						
PEGASUS AND THE PHANTOM RIDERS (<i>Radio Shack</i>)							
303,100	★Mike Grant, Fresno, CA						
244,100	Martinez Domingo, Miami, FL						
67,100	Ryan Grady, Newbury Park, CA						

— Jody Doyle

— Jody Doyle

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

Feedback

In response to questions from:

• Tim Collett: In *Raaku-Tu*, when you get to the south end of a great hallway, go north and you will be at the north end of the hallway. Once you get there you will need to go east to find the lamp. Next, you will need to go west back to the north end of the hallway, and go west again to find the candle. Then you will need to go to the petite chamber and light the candle with the lamp, and attack the gargoyle with the candle and then put it out.

A word of warning: If you get to the room with the vault and pull the lever, you will be killed.

Bryan Tucker
Pine Bluff, AR

• Jared Brookes: Don't use any rings until you have accomplished killing all the creatures on levels 1 through 3 in *Dungeons of Daggorath*.

• John Barsh: I shall make you a deal. I will tell you where the torch is if you tell me where the grapes and the scepter are in *Sands of Egypt*. The torch is two steps south of the cliff, then dig.

• Steven Kaschimer: Get away from all Abye flasks in *Dungeons of Daggorath*. They will kill you if you use them. Save all your Hale and Thews flasks.

• Jason Jasmin: In *Sands of Egypt*, I don't know where the dates are, but the pool I do know. When you are at the cliff, go down, then go west three times, then south and then east.

Eric Reitz
Mendham, NJ

• Richard Deane: To get past the tunnel in *Dragon's Blade*, go into the east room and get a boulder, then come back out. Type THROW BOULDER and when it asks where, type N. Now you can go safely through the tunnel (only if you have the sword from the mine!).

• Robert Taylor: To get the flashlight in *Dallas Quest*, try pulling the curtain.

• Fallon Yager: As far as I know, you do not go across the rug in *Raaku-Tu*. You can solve the game without going to that door.

To kill the wizard's image in *Dungeons of Daggorath*, make sure you have a Hale flask in one hand and either of the two rings in the other. Hit once with the Fire ring, drink a Hale flask, hit with the Ice ring, Hale flask, etc. It takes four shots to kill him.

• Rick Kelton: To find the amulet in *Trekhoer*, look around where you found the Roman numerals . . . especially up.

• Chris Casey: To get out of the dark in *Hitchhiker's Guide to the Galaxy*, wait until it does not list one of the five senses, then use that sense. This works for all the darks.

In *Hitchhiker's Guide to the Galaxy*, how do you get the real tea or common sense?

How do you stop the boat from leaking in *Blackbeard's Island*?

Tom Lawrence
Middlesex, NJ

Scoreboard:

In *Dungeons of Daggorath*, what is the incantation for the Supreme ring?

David Wurmstein
Del Rio, TX

Scoreboard:

In *Dungeons of Daggorath*, to reveal a ring you may want to look the word up in a dictionary and the definition will give you a clue.

D.J. Massa
Linton, IN

Scoreboard:

I've finally become almost invincible on the first level of *Dungeons of Daggorath*, but when I climb to the next level, the ogre fellow of the giant knight's kills me. On Level 1, I get a lot of things hoarded around the ladder, such as a

shield, wooden sword and a bundle of torches. Once, I got a ring and an iron sword, but I can't get them anymore. What do I do now?

Mike Snyder
Allen, OK

Scoreboard:

In *Dallas Quest*, to get the shovel, first drop the owl. Before you go down the ladder, put everything you have (except the flashlight) into the knapsack. Drop the knapsack, turn and go down the ladder with only your flashlight, then drop the flashlight and return to the trading post. Now get the knapsack and go down the ladder.

In *Sands of Egypt*, the torch is buried in the sand. To ride the camel you must first go to the tree and get the dates. Feed the camel the dates and ride the camel. The scepter is hidden in the carving and the ax is on top of the pyramid. You cannot get the rope; you must make your own by getting the palm fronds from the tree and braiding them.

When you are in the treasure room, type GO CRACK. Get back on your boat and float back until you are under the hole. Drop and climb the ladder.

Warning: Never drink the water that is underground.

Philip Manwarren
Harrington, ME

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will immediately forward your letter to the original respondent and, just as importantly, we'll share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type SEND and address to: EDITORS. Be sure to include your complete name and address.

— Jody Doyle



*Bring the CoCo 3's palette
to PMODE 3 and 4 graphics*

The Color Gallery

By Eric White

Just as the autumn leaves were beginning to introduce new colors to nature's palette, Tandy was introducing the CoCo 3 to the world of computer enthusiasts. With its new color abilities, the CoCo is now a real *color* computer. We now have the creative power of choice.

When we select the palette for our graphics, we can actually use color theory techniques such as analogous, monochromatic, secondary and tertiary color schemes. Imagine, purple mountains surrounded above by light, airy blue sky, a valley of golden flowers, and maybe a blackbird flying above.

All this and more! The CoCo 3 is a new beginning, but what happens to the old pictures we created on the previous CoCos? Are they stuck with the old palette of colors? No, *Color Change* will help you fix them.

Color Change allows you to load old *Graphicom* or *CoCo Max* pictures and change their color palettes. The program's menu is controlled with the four arrow keys and the space bar. You'll need a backup disk of Hi-Res (Oh, excuse me, they now call it "Lo-Res") PMODE 3 or PMODE 4 pictures. The pictures will not be harmed, and they will be saved as a standard 6K binary

file, to remain compatible with most commercial software.

Load a picture by selecting the Load option. Once the picture is loaded, select either the upper or lower screen, which will be the picture screen saved back to the disk as a 6K binary file (addresses &H0E00, &H25FF and &H0006).

Make changes to the palette by moving the "change" bar over the colored square you want to modify and press the space bar. The picture will appear; to change the color, press the up or down arrow keys. When finished, press the space bar to accept the color change or press the BREAK key to abort the change. To see the picture at any time, press the F1 key.

When finished with your palette changes, select the Save option to save the currently selected picture area (upper/lower), and the new palette will be coded and stored in the last part of the file's directory entry (bytes 16 through 31). Once you have colorized all your pictures, you will be ready to run the *Color Gallery* program, which displays the "colorized" standard Lo-Res PMODE 3/PMODE 4 pictures on the CoCo 3 in a "gallery."

To use *Color Gallery*, type in the program and save it to a picture disk (disk containing Lo-Res pictures colorized with *Color Changer*), and then run.

The program loads and searches the disk directory for any file with the extension that matches the variable FE\$ in Line 100. Next, it will load and display each picture in the palette that

is stored on the file's directory entry. If the picture file has no palette or if the computer being used is not a CoCo 3, the default palette of "black/red/blue/white" will be used.

Each picture remains on the screen for a few seconds; the time is controlled by variable TM in Line 110. To go to the next picture without waiting, just press the space bar and the program will continue.

Color Gallery can be put on almost any disk of pictures, since it loads the disk directory each time it is loaded and run. Just be sure the extensions of the pictures match the gallery extension variable.

Pal Print is a utility program used to decode and print the palettes of Lo-Res pictures. The output can be directed to the screen or printer. Enter the filename of the picture you want to decode, or press ENTER to decode all the pictures on the disk.

Sitting in front of the CoCo screen is a far cry from walking down the marble hallway of a New York art gallery, yet we can capture some of that awe and appreciation as we view the colorful pictures created by family and friends. Our computer galleries house the artistic creativity enhanced by this electronic age. Color, shape and texture are all there for the artist to control and mold into his own world of expression.

(Questions or comments about these programs may be directed to the author at P.O. Box 609, Altamonte Springs, FL 32715. Please enclose an SASE when writing for a reply.) □

Eric White is a self-taught programmer with a graphic arts background, who has been writing software for five years. He lives in Altamonte Springs, Florida, and has coauthored many programs in association with WHITESMITH.

✓	310	.....42
	1400	.....106
	2900	.....44
	4060	.....126
	5600	.....7
	7500	.....163
	8500	.....42
	9400	.....11
	END	.....224

Listing 1: CHANGER

```

10 *****
20 '*          LOW-RES PICTURE          *
30 '*    PALETTE COLOR CHANGER    *
40 '*  VERSION: 1.0      8610.31  *
50 *****
60 '*    (C) 1986 BY ERIC WHITE    *
70 *****
100 CLEAR2000,31231:PMODE3:PCLEA
R8:DIM CP(15),P$(72),A$(1),SP(24
):P=3:SC=0:OP=7
150 G$="/,5>?%* ?=:/-OLEJOANMBO
LKENLHOL/ 5:??* ?5:/-"+CHR$(34)+
"O@ENOEGKJ@OEJMJOL,,4<<$,(<<8,$
(LLDHLDDHDL@LDLLHLL"
160 FORX=1TO96:MID$(G$,X,1)=CHR$(
ASC(MID$(G$,X,1))+112):NEXT
200 FORZ=0TO15:READ CP(Z),A$:PAL
ETTE Z,CP(Z):NEXTZ
250 ON BRK GOTO 1100
270 'CMP DEFAULT PALETTE COLORS
300 DATA 0 , PMODE COLOR 1
301 DATA 12 , PMODE COLOR 2
302 DATA 7 , PMODE COLOR 3
303 DATA 63 , PMODE COLOR 4
304 DATA 0 , LO-RES COLOR 1
305 DATA 12 , LO-RES COLOR 2
306 DATA 7 , LO-RES COLOR 3
307 DATA 63 , LO-RES COLOR 4
308 DATA 0 ,BG COLOR 128-255
309 DATA 18 ,
310 DATA 16 ,
311 DATA 63 ,
312 DATA 16 ,FG COLOR 0-127
313 DATA 32 ,BG COLOR 0-127
314 DATA 0 ,
315 DATA 38 ,
400 SL$(0)="change":SL$(1)="sele
ct"
500 P(0)=161:P(1)=169:P(2)=177:P
(3)=185:P(4)=353:P(5)=361:P(6)=3
69:P(7)=377
600 GB$=CHR$(128)+CHR$(128):N$="
UNTITLED"
700 G1$=CHR$(143):G1$=G1$+G1$+G1
$+G1$+G1$+G1$

```

```

800 G2$=CHR$(159):G2$=G2$+G2$+G2
$+G2$+G2$+G2$
900 G3$=CHR$(175):G3$=G3$+G3$+G3
$+G3$+G3$+G3$
1000 G4$=CHR$(191):G4$=G4$+G4$+G
4$+G4$+G4$+G4$
1100 CLS0:A$=INKEY$:PRINTG$;
1200 C$=" _BNOXQHFGS_pxwu_AX_DQH
B_VGHSD_":FORX=1TO16:POKE1119+X
,ASC(MID$(C$,X,1))-63:POKE1152-X
,ASC(MID$(C$,33-X,1))-63:NEXT
1300 PRINT@193,G1$GB$G2$GB$G3$GB
$G4$;
1400 PRINT@225,G1$GB$G2$GB$G3$GB
$G4$;
1500 PRINT@257,G1$GB$G2$GB$G3$GB
$G4$;
1600 PRINT@289,G1$GB$G2$GB$G3$GB
$G4$;
1700 PRINT@385,"MODIFY"GB$"MODIF
Y"GB$" SAVE "GB$" LOAD "GB$" LOW
"GB$" HIGH "GB$"GRAPHS"GB$"GRA
PHS"GB$"SCREEN"GB$"SCREEN"GB$"
TO "GB$" FROM "GB$"&H0E00"GB$"&
H2600"GB$" DISK "GB$" DISK ";
1800 U$=" "+CHR$(207)+"=## "+CH
R$(223)+"=## "+CHR$(239)+"=##
"+CHR$(255)+"=## ":SC$(0)="HI-S
CRN":SC$(1)="LO-SCRN":B$=CHR$(14
3)
1900 '
2000 PD=0'PICTURE DISK DRIVE NO.
2100 FE$="PIC"DISK FILE EXTENSI
ON
2200 DE$="/"+FE$+": "+RIGHT$(STR$(
PD),1):PP=OP:KB=0:LD=0:GOTO 310
0
2300 MN=1:GOSUB 10000:MN=0:ON KB
GOTO 2400,2500,2600,2700,2800
2400 PP=PP+4:GOTO 2900
2500 PP=PP-4:GOTO 2900
2600 PP=PP-1:GOTO 2900
2700 PP=PP+1:GOTO 2900
2800 LD=1:OP=PP
2900 IF LD THEN ON PP+1 GOTO 404
0,4040,4040,4040,9950,9950,3200,
3300
3000 IF PP<0 THEN PP=PP+8 ELSE I
F PP>7 THEN PP=PP-8
3100 PRINT@P(OP),GB$GB$GB$;:OP=P
P:PRINT@P(OP),SL$(INT(OP/4));:GO
TO 2300
3200 Y$="SAVE PICTURE TO DISK":G
OTO3400
3300 Y$="LOAD PICTURE FROM DISK"
:GOTO3400
3400 CLS:GOSUB9700:PRINTSTRING$(
32,140)TAB((32-LEN(Y$))/2)Y$:PRI
NTSTRING$(32,131):PRINT
3500 ON PP-5 GOTO 8600,4100

```



```

3600 A$=INKEY$:IF A$="" THEN 3600
3700 SOUND200,1:RETURN
3800 PRINT@128,"":PRINTTAB(6)"ENTER NAME OF PICTURE":PRINT:PRINT:PRINT@233,"";:INPUTY$:RETURN
3900 CLS
4000 A$=INKEY$:GOTO1100
4040 PMODE P,SC*4+1:SCREEN1,1:NC=CP(PP)
4050 PALETTE PP+4,NC:PLAY"P10"
4060 GOSUB1000:IF KB=5 THEN CP(PP)=NC:CP(PP+4)=NC:FORZ=0TO7:PALETTE Z,CP(Z):NEXT:GOTO1100
4070 IF KB=1 THEN NC=NC+1:IF NC>63 THEN NC=0:SOUND1,1
4080 IF KB=2 THEN NC=NC-1:IF NC<0 THEN NC=63:SOUND1,1
4090 GOTO 4050
4100 VERIFY ON
4200 IF DT THEN4600
4300 FORX=1TO12:SP(X)=(X-1)*32+1:SP(X+12)=SP(X)+16:NEXT:Z$="LOAD">:EX$="exitdisk"
4400 NN=0:FORX=1TO72:P$(X)="" :NEXT
4500 DSKI$ PD,17,18,A$(0),A$(1):DN$=MID$(A$(1),113,8):DT$=MID$(A$(1),121,8):FR=FREE(PD)
4600 GOSUB9500
4700 IF DT THEN5000
4800 IF VAL(DT$)=0 THEN 8200
4900 PRINT@66,"WHEN DIR. IS PRINTED,USE THE ARROW KEYS TO SCROLL THROUGH THE LIST OF PROGRAMS ON THE DISK.":GOSUB7400:S=1
5000 S=1:GOSUB7200
5100 FORT=0TO11:Y$=INKEY$:PRINTTAB(7);LEFT$(P$(S+T),8);TAB(23);LEFT$(P$(S+T+12),8):NEXTT:PP=1:LD=0
5200 PRINT@SP(PP),Z$;:P1=PP
5300 GOSUB1000:ON KB GOTO 5400,5600,5800,6000,6200
5400 PP=PP+1:IF PP>NN THEN PP=NN
5500 GOTO6300
5600 PP=PP-1:IF PP<1 THENPP=1
5700 GOTO 6300
5800 PP=PP-12:IF PP<1 THENPP=1
5900 GOTO 6300
6000 PP=PP+12:IF PP>NN THENPP=NN
6100 GOTO 6300
6200 LD=1:P1=0
6300 IF PP=P1 THEN5200
6400 PRINT@SP(P1)," ";:IF LD=0 THEN5200ELSEGOTO8000
6500 IF PP<1THENPP=1
6600 NV=INT((S-1)/24):IFPP>(NN-24*NV) THENPP=(NN-24*NV)
6700 IFPP>24THENPP=24
6800 'IFIN=9THEN7100ELSE IFIN<>8

```

```

THEN6400 ELSEIFS-24<1THEN6400
6900 'IFIN<>8THEN6400
7000 'PP=1:S=S-24:GOTO5000
7100 GOTO 6400'IF S+24>49 OR S+24>NN THEN6400ELSEPP=1:S=S+24:GOTO5000
7200 PRINT@480,USING"## PICTURE";NN-1;:IF NN>2 THENPRINTCHR$(8)"S";
7300 PRINT@0,"";:RETURN
7400 PRINT@232,"READING DIRECTOR Y"
7500 NN=0:FORZ=3TO11
7600 DSKI$ PD,17,Z,A$(0),A$(1):FORQ=0TO1:FORW=0TO3:P$=MID$(A$(Q),W*32+1,32):P1$=LEFT$(P$,1):P1=ASC(P1$):IFP1=0THEN7700ELSEIF P1=255THENGOTO7800ELSE IF MID$(P$,9,3)=FE$ THEN NN=NN+1:P$(NN)=P$
7700 NEXTW,Q,Z
7800 POKE&HFF40,0:NN=NN+1:P$(NN)=EX$
7900 RETURN
8000 IF P$(PP)=EX$ THENDT=0:GOTO3900ELSEDT=1:LD=0:PRINT@492,"LOADING:LEFT$(P$(PP),8);:PCLS1:SCREEN1,1:LOADM LEFT$(P$(PP),8)+DE$:N$=LEFT$(P$(PP),8)
8010 IF MID$(P$(PP),17,16)=STRING$(16,0) THEN 8100 ELSE FORX=0TO15:CP(X)=ASC(MID$(P$(PP),17+X,1)):NEXT:FORX=0TO7:PALETTE X,CP(X):NEXT
8100 PLAY"P50":GOTO 1100
8200 CLS:PRINT@66,"HEY! THIS DISK HAS NO NAME!"
8300 PRINT@96," WHAT DO YOU WANT TO NAME IT?:PRINT@269,".....":PRINT@266,"";:INPUTDN$:IF DN$=""OR LEN(DN$)>8GOTO8300
8400 PRINT@321,"ENTER TODAY'S DATE FOLLOWED BY":PRINT@355,"YOUR IDENTIFICATION LETTER":PRINT@395,"YYMM.DDI":PRINT@392,"";:INPUTDT$:IF DT$="" OR LEN(DT$)<>8THEN8

```

Hint . . .

High-Speed Hijinx

If you want to include the high-speed poke in a program that performs printer output, keep in mind you don't have to turn off the high-speed poke. Just issue a baud rate poke at the beginning of your program that uses a baud value half that which you would normally use. For example, instead of using POKE 150,1 to set your computer for 9600 baud printing, use POKE 150,7 to set it to 4800 baud.

James M. Stewart
(WHEELJIMMER)
Highland Falls, NY


```

400
8500 DSKI$ PD,17,18,A$(0),A$(1):
MID$(A$(1),113,16)=STRING$(16,32
):MID$(A$(1),113,8)=DN$:MID$(A$(
1),121,8)=DT$:DSKO$ PD,17,18,A$(
0),A$(1):DT=0:GOTO1100
8600 PRINT@128,"";A$=INKEY$
8700 IF N$="" THEN INPUT"NAME OF
PICTURE TO BE SAVED";N$ ELSE Y$
=N$:GOTO8800
8800 PRINT:PRINT:IF Y$="" THENPR
INTTAB(5)"ABORT ILLEGAL FILE NAM
E!":SOUND5,10:GOTO1100
8900 IF SC THEN GOSUB 10700
9000 Y$=LEFT$(Y$,8):SAVEM Y$+DE$
,&HE00,&H25FF,&H0006:IF SC THEN
GOSUB 10700
9100 CP$="":FORZ=0TO15:CP$=CP$+C
HR$(CP(Z)):NEXTZ
9200 FORZ=3 TO 11:DSKI$ PD,17,Z,
A$(0),A$(1):FORQ=0 TO 1:FORW=0 T
O3:IF Y$+FE$=MID$(A$(Q),W*32+1,1
1) THEN MID$(A$(Q),W*32+1+16,16)
=CP$:DSKO$ PD,17,Z,A$(0),A$(1):Z
=11:Q=1:W=3
9300 'PRINT MID$(A$(Q),W*32+1,32
):EXEC44539
9400 NEXT W,Q,Z:GOTO1100
9500 CLS:PRINT@384,STRING$(32,14
3)DN$" "RIGHT$(DE$,2)TAB(11)B$DT
$B$;:PRINTUSING"## GRANULE";FR;:
IF FR>1 THEN PRINT"S"

```

```

9600 PRINT@395,B$;:PRINT@404,B$;
:PRINT@391,CHR$(143);:GOTO9800
9700 PRINT@384,STRING$(32,143):P
RINT@416,"PALETTE";:PRINTUSINGU
$;CP(0),CP(1),CP(2),CP(3)
9800 PRINT@448,STRING$(32,143)"S
CN:";SC$(SC);B$"PICNAME:"N$;LEFT
$(DE$,3);:POKE1535,ASC(RIGHT$(FE
$,1)):PRINT@459,B$;
9900 PRINT@0,"";:RETURN
9950 SC=PP-4
9960 PMODE P,SC*4+1:SCREEN1,1
9970 EXEC44539:GOTO1100
10000 KB=0' READ KEYBOARD
10100 IF PEEK(342)=247 THEN POKE
342,255:KB=1
10200 IF PEEK(341)=247 THEN POKE
341,255:KB=2
10300 IF PEEK(343)=247 THEN POKE
343,255:KB=3
10400 IF PEEK(344)=247 THEN POKE
344,255:KB=4
10500 IF PEEK(345)=247 OR PEEK(3
38)=191 THEN POKE 345,255:KB=5
10550 IF PEEK(343)=191 THEN SCRE
EN1,1 ELSE IF MN=1 THEN SCREEN0,
0
10600 IF KB=0 THEN 10100 ELSE PL
AY"P255":RETURN
10700 FORX=1TO4:PCOPY X TO 19:PC
OPY X+4 TO X:PCOPY 19 TO X+4:NEX
T:RETURN

```

Listing 2: GALLERY

```

10 *****
20 '* LOW-RES PICTURE GALLERY *
30 '* WITH PALETTE CONTROL *
40 '* VERSION: 1.0 8611.02 *
50 *****
60 '* (C) 1986 BY ERIC WHITE *
70 *****
80 A$=INKEY$:F=FREE(PEEK(&HEB))
90 CLS0:PCLEAR8:CLEAR2000:IF PEE
K(33021)=50 THEN PMODE3,5:PCLS0
ELSE PMODE 4,5:PCLS1
100 FE$="PIC"DISKFILE EXTENSION
110 TM=3500'TIMEOUT BETWEEN PICS
120 DIMNF$(71):X=0:FORS=3TO11
130 DSKI$ PEEK(&HEB),17,S,A$,B$
140 C$=A$+LEFT$(B$,127)
150 FORN=0TO7
160 NF$=MID$(C$,N*32+1,32)
170 IFLEFT$(NF$,1)=CHR$(0)THEN21
0
180 IFLEFT$(NF$,1)=CHR$(255)THEN
N=7:S=11:GOTO210
190 IFMID$(C$,N*32+9,3)<>FE$ THE

```

```

N 210
200 NF$(X)=NF$:X=X+1
210 NEXTN,S
220 SCREEN1,1
230 FORI=0TO X-1:IF NF$(I)="" TH
EN CLS:PRINT"THERE IS NO PICTURE
S ON THIS DISK WITH THE EXTEN
SION -'FE$'":END
240 F$=LEFT$(NF$(I),8)+"/"+FE$
250 LOADM F$
260 IF PEEK(33021)=50 THEN FORT=
4TO7:PALETTE T,63:PLAY"P50":NEX
T
270 FORT=1TO4:PCOPY T TO T+4:NEX
T
280 IF PEEK(33021)=50 THEN GOSUB
310
290 FORT=1TO TM:A$=INKEY$:IF A$=
"" THEN NEXTT ELSE T=TM:NEXTT
300 SCREEN1,1:NEXTI:GOTO 230
310 IF MID$(NF$(I),21,4)=STRING$
(4,0) THEN PALETTE 4,0:PALETTE 5
,12:PALETTE 6,21:PALETTE 7,63:RE
TURN
320 FORT=4TO7:PALETTE T,ASC(MID$
(NF$(I),17+T,1)):PLAY"P50":NEXTT
:RETURN

```


Listing 3: PALPRINT

```

10 *****
20 * DECODE AND PRINTS COLORS *
30 * LOW-RES PALETTES *
40 * VERSION: 1.0 8611.02 *
50 *****
60 * (C) 1986 BY ERIC WHITE *
70 *****
80 A$=INKEY$:F=FREE(PEEK(&HEB))
90 CLS:PCLEAR8:CLEAR2000
100 FE$="PIC"DISKFILE EXTENSION
110 PRINT"OUTPUT TO (S)CREEN OR
(P)RINTER"
120 A$=INKEY$:IF A$="" THEN 120
130 IF A$="S" THEN DV=0:GOTO 150
140 IF A$="P" THEN DV=-2 ELSE 90
150 CLS:PRINT" ENTER THE NAME OF
PICTURE FOR DECODING OF PAL
ETTE COLORS OR PRESS [ENTER
] TO DECODE ALL PICTURES
ON DISK"
160 PRINT@200,"";:INPUTN$
170 IF N$>" " THEN N$=N$+STRING$(
8-LEN(N$),32)
180 DIMNF$(71):X=0:FORS=3TO11

```

```

190 DSKI$ PEEK(&HEB),17,S,A$(0),
A$(1)
200 FOR C=0TO1:FOR N=0TO7
210 NF$=MID$(A$(C),N*32+1,32)
220 IFLEFT$(NF$,1)=CHR$(0)THEN27
0
230 IFLEFT$(NF$,1)=CHR$(255)THEN
N=7:S=11:GOTO270
240 IFMID$(A$(C),N*32+9,3)<>FE$
THEN 270
250 IF N$>" " AND LEFT$(NF$,8)<>N
$ THEN 270
260 NF$(X)=NF$:X=X+1
270 NEXTN,C,S
280 FORI=0TO X-1:IF NF$(I)="" TH
EN 340
290 PRINT#DV,CHR$(27)CHR$(20);'C
ONDENSED PRINT FOR DMP-200
300 CLS:PRINT#DV,"PICTURE NAME:
"LEFT$(NF$(I),8)"/"FE$:PRINT#DV
310 FORT=0 TO 15
320 PRINT#DV," SLOT ";:PRINT#DV
,USING"##";T;:PRINT#DV,"="ASC(MI
D$(NF$(I),17+T,1)),
330 NEXT T:IF DV=0 THEN PRINT@45
1,"PRESS ANY KEY TO CONTINUE.";:
EXEC44539 ELSE PRINT#DV:PRINT#DV
340 CLS:NEXTI:GOTO 100

```

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I was thumbing through the September issue of THE RAINBOW and idling away the time in my hotel room, waiting to compete in the 1987 Florida Star Ball, a dance competition. I plopped down on the bed and flipped to the contents page to see the latest offerings.

The article "Not Just Child's Play" by Ann B. Mayeux caught my eye. Working as a volunteer with learning disabled children at the Lakeview School in Hernando, Florida, I was tempted by the program. I wondered if it might be of value to "my kids."

Upon reading the text and noting that a 32K, ECB CoCo was required for either tape or disk, I turned to the listing.

It was a daunting listing, running for about seven or eight tightly formatted pages. It was the kind of graphics program, loaded with oodles of DRAW, CIRCLE, PAINT and LINE statements, that is near and dear to my heart. The illustrations for the A, B and C panels were intriguing. How would they look on my CoCo? Dare I copy the listing? Would the ultimate users — the students — find it to be fun and entertaining?

My gaze turned dreamily to the ceiling and I speculated — if I usurped a few panels and put them on tape, I could bring them to Ms. Hudson's class at Lakeview. If they liked the panels, I'd break down and copy the entire program!

Upon returning home with my trophies, I unpacked and wandered into my computer nest.

One tutorial coming up!

Please open your personal copy of the September '87 issue of THE RAINBOW to pages 60 and 61. (Refer to this month's listing if your copy is lost, has strayed or was stolen). The first question is where the first panel, A, is located. The clue is in the routine from Line 130 to Line 400. Line 140, letter A, sent me searching for Line 410. Line 150, letter B, referred me to Line 510. Ergo, between lines 410 and 510 lay nestled the A panel.

Checking out the lines in question revealed a lot of closely packed, multi-

A tutorial on typing in programs

Previewing a Program

By Joseph Kolar
Rainbow Contributing Editor

line statements. I drooled in anticipation because closely packed, multi-line statements are a good indication of lots of goodies waiting to be revealed.

Suggestions at the Starting Gate

Instead of mindlessly typing away to reproduce this lengthy program, get out the old ECB manual and reacquaint yourself with DRAW, PAINT, CIRCLE and LINE statements. Get their formats straight in your mind. As you key in a statement, try to visualize what you are asking CoCo to do.

After you complete a program line (if you are a conscientious copier), check the characters at the right end of each row with the listing. If they are not the same, you might have left out a character, added unnecessary, though harmless, spaces, or inadvertently slipped in an extra, uncalled-for character. We all do it, so join the club!

Also, check to see under which character the final character in the line falls.

Don't be "smart" and anticipate what you think the author intended or correct what seems to you to be an error in the listing. You will be sorry!

The first thing you know, you become engrossed in seeing each new unit of the program emerge, and you happily clack, clack away far into the night.

After tap, tap, tapping for a few hours

at the keyboard, you may get an SN, FC or other error message. Checking and rechecking the listing and the program line does not divulge the error. If it is a multiple-statement program line, perform a little surgery and edit out the last statement and run. Keep it up! Lop off the last statement and run until CoCo doesn't produce the message. Then retype the balance of the line that must have contained the elusive error.

A second way to combat an obstinate gremlin is to rekey the entire line.

If you are still perplexed and unable to discover the boo-boo, ask a disinterested spectator in your household to compare your work with the listing.

A final ploy is to make a few copies of your work in progress and shut down for the day — or night — and sweep out the cobwebs in your mind to get a fresh perspective on the morrow.

Targeting the Listing

My object was to yank out the A panel and display it on the screen.

Beginning at Line 410, I copied and ran the listing up to Line 500. I got the black screen and the sound. Now, PCLS2 calls for a yellow screen. A PMODE was needed. I noticed a PMODE3,1 in Line 130 and copied this line. Then I copied Line 140, as it directs CoCo to Line 410, the target area.

I ran this three-liner and it became evident that a stop-the-action line would be useful. I settled on 510 GOTO 510.

Line 510 is the start of the B panel in Ann Mayeux's program. If and when I get to it, I can key in the true program line (which deletes my false Line 510) and continue keying in lines through 580 for the B panel. I can then use Line 590, the beginning of the C panel, as my temporary perpetual loop.

What did I accomplish? I found the first part of the panel. Evidently, an 'A' was printed on a blue background. By running my working program, I found I had no error message to warn me of impending doom. Whew! What a relief! Now, if I had an SN, FC, TM or BS Error, etc., I could search out and correct it as I went along.

I added Line 430 and ran the program. Naturally, I got an FC Error. A quick check proved that I had mis-typed a 9 for a J. I edited out the boo-boo and was pleased to see the airplane pop up on the screen.

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

When typing in Line 440, I got an SN Error message. No big deal! I found I spelled FIR for FDR (note tongue-twister), one of my common garden variety boo-boos. Note: You could go right into the EDIT mode. Upon isolating the SN Error, correct it and move on. I prefer to be more relaxed about it and enjoy weeding out my inevitable errors. I begin by entering LIST 440. After I pinpoint the error, I get into the EDIT mode.

I have found that after many hours at the keyboard, there is a tendency to become weary, and, when in the EDIT mode, I usually compound the boo-boo instead of eradicating it. So, like they say, "Slow, but sure."

After all this work, CoCo added what proved to be an alligator's tail to the display.

Adding LINE 450 drew in the foot. The line was too long; something was missing. A close check revealed that the X motion command was missing. Spelling out the XAL\$; variables extracted AL-I-R-P-L-L-N-E. AL must be the designation for the character A.

Since the alphabet variables must be made known to CoCo before they can be called, a program line with AL\$ must have been created someplace in front of Line 130.

Line 80 started with AL\$, and a quick review of AL\$="UG63FD3NL6D4BR5" proved that it was a 9-by-6 unit sized A.

Since the lack of variables for the substrings, XAL\$, etc., didn't hurt the flowering program displayed, it was onward and upward!

Line 460 produced more of the alligator without any further error mishaps on my part.

Remember, after each additional line, the extant program is run — first, to see what is what, and second, to correct as

many mistakes as possible that crop up. The alligator was fleshed out and colored green.

Line 480 was a "word" line, so I didn't expect to see anything new. What I did find out was that, so far, there were no FC and SN Errors — which, being a careless typist, I am an expert at invoking.

Soon I got the drift of Ann Mayeux's programming style. I paid more attention to each line and what it signified. Line 490 was a couple of painted, partial circles. I ran it to verify what I had mentally conjured. I repeated the error where I keyed in a 9 for a) in the CIRCLE statement. Being aware of the kinds of errors I am prone to make causes me to focus automatically on likely problem areas.

Line 500 looks like it made the apple stem, spelled out the word "apple" and returned to the panel choice routine at Line 130.

When I ran this, CoCo raced through the program, and I hardly saw what happened. An easy solution would have been to temporarily edit out GOTD130 from Line 500 to hold the display.

Better still, adding the line 400 GOTD 130, which closed out the INKEY\$ letter-panel choice routine (lines 130 through 400), gave me the excruciating task of tapping the A key to get the A panel. I could delete Line 510 as being redundant.

At this point, I could take a breather and double-check to see if my numerical values were keyed in correctly. CoCo is not likely to complain if you use an incorrect value. It will show up on the screen by distorting the display in some manner. Thus, if you check each line as you add it to your copied program and correct errors you are alerted to (such as SN or FC errors), you can inspect the display for an incorrectly located,

drawn or painted item.

If you do these things, you will be correcting a major portion of your errors and have a relatively error-free expanding program.

Suppose Line 500 ended in GOSUB1000 instead of GOTD130. If you ran it, you would get a UL Error.

What happened was that CoCo was directed to a program line that started a subroutine you hadn't yet reached. A temporary solution would be to key in 1000 RETURN. But this would result in an RG Error. The solution to hold the display is to put something in LINE1000 that will take it out of its RG Error condition.

Entering 1000 GOTD130:RETURN works. We used the INKEY\$ routine to exit the GOSUB routine.

This should hold everything until you rekey Line 1000 when you finally get to it. But this is only one ploy you can use.

As it stands now, we have the panel complete except for the lettering. In order to present a properly finished display panel to the children, it is a prerequisite to key in lines 80 through 110.

After keying in Line 80, I ran the program and saw that the A's and E's were OK. After keying in and running the next line, Line 90, the G's and L's appeared. Upon keying in Line 100, I was delighted to see "airplane" and "apple" come out perfectly. The 't' was missing in "alligator," but in a few minutes that would be taken care of. After completing Line 110 and running the program, I got the 't' inserted in its rightful place.

I ended up with a complete, and I might add, impressive, panel that I plan to use to amuse and educate the children.

At this time, we might as well verify that all the letters we used and didn't use

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were created without mishap. Temporarily insert these lines:

```
120 PMODE3,1:PCLS2:SCREEN1,0
:DRAW"C4BM10,20"+AL$+B$+C$
+D$+E$+F$:DRAWG$+H$+I$+J$+K$
+L$:DRAWM$+N$+O$+P$+Q$:DRAWR$
+S$+T$+U$+V$
121 DRAW"BM10,40"+W$+X$+Y$
+Z$
129 GOTO130
```

Running this verifies that all letters are OK and the spacing between letters is adequate. Now, pressing the A key gives the A panel.

Let us give credit where credit is due . . . to Ann Mayeux. Key in lines 10 through 30.

The following are the lines we left out. Line 40 looks like the "BREAK key disable" routine. Lines 50 through 70 throw up the title with some musical accompaniment. Line 120 gives a few instructions, and lines 150 through 390 direct CoCo to the B through Z panels. Later, we will add them to our complete program.

All we need is the time and patience to forge onward. This method I have shown you is helpful when keying in

long, complex, mind-boggling programs. You can alter it to work with other programs.

Review

First, take a sampling of the program. Who wants to key in a program that takes days of effort and debugging, only to find out it is disappointing?

Second, we debug as we go along, ensuring accurate, error-free work.

Third, as we become familiar with the author's techniques, we can study, absorb, anticipate and appreciate the program lines and the plot as it unfolds.

How would you like to type in the entire program and then drive yourself nuts trying to debug all the errors you keyed in? For instance, take the listing, which is the dollop usurped from Ann Mayeux's original program. Key it in entirely before running it. Then run it and see how difficult it is to track down the errors, even in a straightforward program like this one.

A helpful hint to aid you in your debugging efforts is to become aware of the typing errors you customarily make. If you make a mental list of the kinds of errors you tend to make in DRAW

statements, for example, you know what to look out for. In my case, I have a tendency to leave out the opening quote mark, omit the comma between the h,v (horizontal, vertical) values and type a 4 instead of a \$. In the LINE statement, I often omit the - or type in = by mistake. Also, I must watch the parentheses, which I am apt to make into an 8 or 9.

Everybody has his or her own set of idiosyncratic mistakes. Become aware of yours and you will be able to make rapid corrections.

On your own, add only the necessary lines to compose the B panel. Delete lines 120 through 129 and add 590 GOTO 590.

Correct as you go along. By now you must be eager to undertake keying in the rest of this delightful program.

Moral of this tutorial: Read, enjoy and, above all, utilize the programs presented for your pleasure in THE RAINBOW. They are a fine learning experience.

Editor's Note: To utilize a Speech/ Sound Pak with Ann Mayeux's ABC program, refer to John Linge's "Sounding Out the ABCs" on Page 142. □

The listing:

```
0 '<LISTING1> EXCERPT FROM-----
10 ' A*B*C
20 ' BY ANN B. MAYEUX
30 ' KEY WEST, FL.
80 AL$="U6E3F3D2NL6D4BR5":B$="U9
R3F2G2L3R4F2G3L3BR11":C$="U9R6BD
9L6BR11":D$="U9R4F2D5G2L4BR11":E
$="U9R6BD4L6D5R6BR5":F$="U9R6BD5
L6D4BR11"
90 G$="U9R6BD4NL2D5L6BR11":H$="U
9D4R6U4D9BR5":I$="NU9BR6":J$="NU
2R6NU9BR5":K$="U9BR6G6E3F3D3BR5"
:L$="NU9R6BR5":M$="U9F4E3D9BR5"
100 N$="U9D2F6DNU9BR5":O$="U9R6D
9L6BR11":P$="U9R6D5L6D4BR11":Q$=
"U9R6D9NF3L6BR11":R$="U9R6D4L6R3
F3D2BR5":S$="R6U5L5U4R5BD9BR5"
110 T$="BR3U9L3R6BD9BR5":U$="NU9
R6NU9BR5":V$="BU9D6F3E3U6BD9BR5"
:W$="NU9E4F4NU9BR5":X$="M+6,-9BL
6M+6,9BR5":Y$="BR3U4H3U2BR6D2G3D
4BR8":Z$="BU9R6D2G6DR6BR5"
120 PMODE3,1:PCLS2:SCREEN1,0:DRA
W"C4BM10,20"+AL$+B$+C$+D$+E$+F$:
DRAWG$+H$+I$+J$+K$+L$:DRAWM$+N$+
O$+P$+Q$:DRAWR$+S$+T$+U$+V$
121 DRAW"BM10,40"+W$+X$+Y$+Z$
129 GOTO130
130 PMODE3,1:A$=INKEY$
140 IFA$="A" THEN410
400 GOTO130
410 PCLS2:SCREEN1,0:PLAY"L6C"
420 DRAW"C3BM0,70R255C2":PAINT(1
00,30),3,3:DRAW"BM10,50M30,20M50
,50BM20,35R20C4"
430 CIRCLE(150,30),50,2,.25,.3,.
05:DRAW"C2BM150,30L20F20R20H20F1
0R30H8R10F10L10H10BU8E12R4D15C4"
440 FORH=120TO170STEP10:PSET(H,2
7,2):NEXTH:CIRCLE(60,145),45,.8
5,.25,.72:CIRCLE(72,157),35,.8,
.3,.65
450 DRAW"C2BM120,65XAL$;XI$;XR$;
XP$;XL$;XAL$;XN$;XE$;C4":CIRCLE(
65,138),13,,1.3,.2,.05:DRAW"BM75
,141R5G4F6L5D6H6"
460 DRAW"BM78,138R45E10G10F15G5R
5F5E5R5H20E5G5R65E3U9H3G3L7H3G3L
14H3G3U5E6R3U3E6R3U3E6R3U3E6R3U5
H10L3D5G25"
470 CIRCLE(150,105),10,,1.2,.3,0
:CIRCLE(150,105),5,4:LINE(140,10
5)-(53,110),PSET:PAINT(100,115),
1,4:PAINT(65,138),1,4
480 DRAW"BM70,180XAL$;XL$;XL$;XI
$;XG$;XAL$;XT$;XO$;XR$;"
490 CIRCLE(215,110),10,,1.7:PAIN
T(215,110),4,4:CIRCLE(228,110),1
0,,1.7:PAINT(232,110),4,4
500 DRAW"BM210,85F15U15E10D10G10
":PAINT(230,87),1,4:DRAW"BM200,1
50XAL$;XP$;XP$;XL$;XE$;":GOTO130
```


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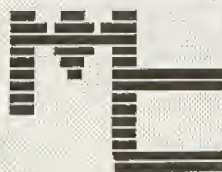
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For over a year now I have been putting off the inevitable. I knew when the CoCo 3 came out I would eventually have to buy one, but I just kept putting it off. Well, I finally succumbed.

Some readers have asked when I would start writing programs for the CoCo 3, but I feel I have some legitimate reasons for putting it off. First, although many people have been buying this dandy, improved model, the overwhelming majority of RAINBOW readers still have CoCo 1s or 2s. The last thing I want to do is write programs that would be useless to the majority of my readers. Second, I was a little too cheap to put up the money for a whole new system. However, when the price of the full system finally dropped below \$300, the time seemed right to make the move. It also gave me an extra system (my old one) to bring to school and use with my students. (More on that later!!)

New Worlds to Conquer

Needless to say, it didn't take me long to fall in love with the CoCo 3, which is everything the original CoCo wasn't. My first reaction was, naturally, to come up with a program to celebrate my new purchase. However, I made a pledge to myself and to all my readers: Unless I am using CoCo 3 graphics (which will be some time to come, at least in this column), any program I write for the CoCo 3 will include changes that allow it to work on a CoCo 1 and 2.

Once Upon a Time

Many moons ago, when I first started writing the "Wishing Well," I presented a program called *Multiple Choice Quiz-maker*. There were two versions of that program, a Hi-Res version that used real upper- and lowercase letters and a Lo-Res version that used the CoCo's text characters. I later listed a hard copy

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

The Ultimate Testing Programs

By Fred B. Scerbo
Rainbow Contributing Editor

version that would create paper tests with a line printer.

For several years, I have been tempted to combine the two programs into one so they could use the same DATA statements. Normally, I would just merge the data from one program to the other; however, that is not the best way to have new readers accomplish the task. Owning the new CoCo 3 provided a perfect excuse to make a new version and to throw in speech from the Speech Pak, as well. Besides, many readers still ask me for copies of old programs or reprints of old articles, which I have neither the time nor resources to provide! Making a whole second genera-

tion of these programs would solve this problem very easily.

The Program

SuperTest will take a set of phrases you generate in BASIC DATA statements and turn them into a random quiz on the screen or on paper. Every time the program is run, the results are different. In fact, it's a different test each time you run it.

In order to create any quiz or test, you need to match two pieces of information, such as a question and an answer, or a sentence with a blank and information to fill it, synonyms (two words that mean the same thing) and so on. You would need at least five groups in order to make a quiz on *SuperTest*.

All information is stored in DATA statements at the end of the program. *SuperTest* can easily be rewritten to use disk files; however, when I write an educational program for my students, I like to have the program free-standing so that no information needs to be loaded into it. Besides, it is so much easier to edit a line in the program using BASIC's EDIT command than it is to try to edit a file.

There are great advantages in using this type of program, whether with students in school or with your own youngsters at home. Reviewing material with a computer makes it easier to strengthen many skills, including foreign language translations (*bon jour*: good day).

In order to put your own DATA into my program, you must first type DEL1000-5000 and press ENTER. This dumps the sample data I have put in. Let's say you want to do synonyms; your data would start in Line 1000 and

```

NAME _____ DATE _____
TEST ON: EXPLORING OUR SOLAR SYSTEM

1. GALILEO _____
(1) VEHICLES SENT TO JOVIAN PLANETS
(2) DISTANCE FROM THE EARTH TO THE SUN
(3) NUMBER OF EARTHS THAT WOULD FIT INSIDE JUPITER
(4) WHAT THE SURFACE OF MARS IS COVERED WITH
(5) NOT GIVEN

2. PIONEER _____
(1) DISTANCE FROM THE EARTH TO THE SUN
(2) FIRST VEHICLE SENT TO JUPITER AND SATURN
(3) WHAT THE SURFACE OF MARS IS COVERED WITH
(4) VEHICLES SENT TO JOVIAN PLANETS
(5) NOT GIVEN
  
```


look like this:

```
1000 DATA HAPPY, GLAD
1010 DATA LOUD, NOISY
```

Your last data line should be Line 5000 and have END as a flag and the title of your program separated by a comma.

```
5000 DATA END, SYNONYMS 1
```

The comma must be placed between each of the two pieces of data you want matched. If your statement needs to include a comma, wrap each segment in quotation marks, like this:

```
1000 DATA "ABRAHAM, MARTIN AND JOHN", "BY DION"
```

Without the quotation marks, BASIC would assume that the comma after ABRAHAM was the end of our first statement. When in doubt, wrap in quotes or put each statement into a separate line:

```
1000 DATA "ABRAHAM, MARTIN AND JOHN"
1005 DATA "BY DION"
```

In this case, no comma is needed between statements, and all information is wrapped in quotes.

The program is designed to hold 50 DATA statements. You may increase the number, if you wish, by changing the value of NM in Line 180, which presently reads 180 NM=50. This would change all other values such as the DIM statements for our arrays.

Changes for CoCo 1 and 2

This program will work very easily on a CoCo 1 or 2 but will not have some extra screens the CoCo 3 version uses. If you use the program on a CoCo 1 or 2, you must delete the following lines:

9, 315, 320, 325, 330, 335, 340, 410 and 535. You should add the following lines:

```
315 SW=31
410 REM
535 REM
```

Rather than delete the above lines, you could insert REM at the beginning of each line except the new Line 315. This way, if you upgrade to a CoCo 3, you won't have to add these lines back in later. Either way, the program will run much like the original. The only difference is the lack of real upper- and lowercase letters. This is not that serious a drawback; however, if you have small pieces of information, such as single words, the regular 32-character screen of the CoCo is much better — you won't have much blank screen area.

A New Feature

Besides speech, I have added one new feature to both the paper and screen quiz parts of the program. The original programs allowed for four choices plus 5) NOT GIVEN. I put this option into the original program because some of the standardized tests that our students take include "not given" as a choice. However, in the past few years I have found that many of my students have a rough time with the "not given" category. (Also, my special needs students are usually exempt from taking group tests.) Therefore, the screen will allow you to choose whether or not you want the "not given" category included.

Running the Program

There is really not too much more to say about the program, since it is self-prompting. Pressing the @ key during a question allows you to check your score. Pressing C continues the program where you left off.

If you use the HARDCOPY section, you

may use either standard or double-width characters, selectable from the keyboard. As the test is printed, the printing will stop as you approach the bottom of the page. You may print the next line of text by pressing N. This helps prevent the choices of a question from being printed on different pages. You may then advance the paper to the next page and press ENTER to continue printing.

The listing printed here has no bugs. If you get an OD Error, you probably made a mistake in the DATA statements at the beginning of the listing. You may even get an FC Error as a result of having made a mistake in the data as you typed it in. Make sure to correctly type in every comma and number as they appear in these opening lines, or the program will crash.

Try this program with your own data. I think you will find it very useful when working with your children or students. *SuperTest* can be useful even to college students. It gives you a real hand with controlled learning via computer.

Be sure to let me know if you have other ideas for CoCo 3 programs that won't cast our CoCo 1 and 2 owners adrift.

Help Me, Please!

At this point I would like to make a personal pitch to you, my reading audience, who have been so supportive. This year I received some of the toughest special needs students I have ever had to work with. While, in recent years, only a few of my students in a given class period have worked on the CoCo, this year I have groups as large as eight students needing computer time.

Fortunately, I have been able to expand the number of CoCo stations in

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(not currently certified)

my room to five. Some friends donated old silver case CoCos they no longer use since upgrading to a CoCo 2 or 3. That's when this idea hit me.

I am sure there are many of you out there who have old 16K or 32K silver body CoCos that are now collecting dust. If you do, and would be willing to donate them, the students in our program would benefit greatly.

Any such donation to a school can be claimed as a tax deduction, but you would have to consult your tax preparer to determine how to go about it. I can easily supply you with a receipt for tax purposes should you make such a donation.

So, how about it? If you have any CoCos you can spare, you can contact me at (413) 663-9648 most evenings between 9 and 11 p.m. I can't promise to reimburse you for shipping; however, I will promise that any machines, drives, tape players or other CoCo accessories you donate will be put to use helping either my special needs students or special needs students in the middle and elementary school levels. (We can even use old ROM-Pak versions of *Color Scripts*.)

CoCos may be sent either to Fred B. Scerbo, 60 Harding Ave., North Adams, MA 01247 or to Drury High School, Special Needs Department,

South Church St., North Adams, MA 01247, Attn: Fred B. Scerbo.

Any help will be greatly appreciated, and all donations will be put to extremely good use. Thank you.

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

45	.....100	570	.....8
145	.....40	685	.....4
260	.....29	760	.....231
350	.....172	1040	.....113
470	.....192	END	.....182

The listing: SUPRTEST

```

1 REM*****
2 REM*          SUPRTEST          *
3 REM*    A TEACHER'S HELPER      *
4 REM*    BY FRED B.SCERBO        *
5 REM*    60 HARDING AVENUE      *
6 REM*    NORTH ADAMS,MA 01247   *
7 REM*    COPYRIGHT (C) 1987     *
8 REM*****
9 WIDTH 32
10 CLEAR3000:CLS0:PRINTSTRING$(3
2,172)STRING$(32,204);
15 FORI=1TO192:READA:PRINTCHR$(A
+128);:NEXT
20 PRINTSTRING$(32,195)STRING$(3
2,163);
25 DATA30,28,29,21,,21,21,28,28,
26,30,28,29,21,28,28,29,53,60,61
,60,61,53,60,61,53,60,60,58,62,6
2,61
30 DATA26,,20,21,,21,21,,,26,26,
,20,21,,,21,52,,53,,52,53,,52,53
,,,56,56,58,52
35 DATA27,19,19,21,,21,21,19,19,
26,27,19,18,21,19,19,23,,,53,,,5
3,51,51,53,51,51,50,,58,
40 DATA,,21,21,,21,21,,,26,,16,
21,16,25,16,,,53,,,53,,,,,58,,5
8,
45 DATA18,,21,21,,21,21,,,26,,1
7,21,,,25,,,53,,,53,,49,49,,,58,
,58,
50 DATA27,19,23,21,19,23,21,,,2
7,19,23,21,,,21,,,55,50,,53,51,5

```

```

5,53,51,51,58,49,59,
55 PRINT@357," A TEACHER'S HELP
ER ";;PRINT@389," (P)APER OR (S
)CREEN ";
60 PRINT@421," BY FRED B.SCERB
O ";
65 PRINT@453," COPYRIGHT (C) 19
87 ";
70 X$=INKEY$:IFX$="S"THEN HC=0:G
OTO85
75 IFX$="P"THEN HC=1:GOTO180
80 GOTO70
85 PRINT@389," (T)ALKING OR (N)O
T ? ";
90 X$=INKEY$:IFX$="T"THEN110
95 IFX$="N"THEN105
100 GOTO90
105 NT=1
110 REM TALKING
115 XX=&HFF00:YY=&HFF7E
120 POKEXX+1,52:POKEXX+3,63
125 POKEXX+35,60
130 GOTO180
135 IFNT=1THENRETURN
140 FORII=1TOLEN(W$)
145 IF PEEK(YY)AND 128=0 THEN145
150 POKEYY,ASC(MID$(W$,II,1))
155 NEXTII
160 IFPEEK(YY)AND128=0THEN160
165 POKEYY,13
170 FORHH=1TO900:NEXTHH:RETURN
175 RETURN
180 NM=50
185 DIMAO(NM),A$(NM),B$(NM),NP(N
M)
190 GOTO225
195 IF LEN(JK$)<=SW THEN215
200 FOR T=SW TO 0STEP-1:IF MID$(
JK$,T,1)=" "THEN210
205 NEXT T:GOTO215
210 L$=LEFT$(JK$,T):W$=L$:GOSUB2
20:JK$=" "+RIGHT$(JK$,(LEN(JK$
))-T):GOTO195

```



```

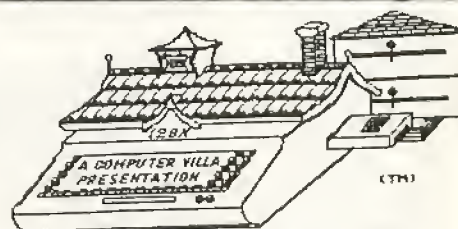
215 W$=JK$:PRINTW$:GOSUB135:RETU
RN
220 PRINTW$:GOSUB135:RETURN
225 FORJ=1TO NM:READ A$(J),B$(J)
:IF A$(J)="END" THEN235
230 NEXTJ
235 REM TITLE CARD
240 PRINT@357," DO YOU WANT TH
E ";PRINT@389," DATA REVERSED
(Y/N)? ";
245 T$=INKEY$:UH=RND(6666):IF T$
="N"THEN 265
250 IF T$="Y" THEN260
255 GOTO245
260 FOR Q=1 TO J-1:TEM$=A$(Q):A$
(Q)=B$(Q):B$(Q)=TEM$:NEXT Q
265 J=J-1
270 FORI=1 TO J
275 AO(I)=RND(J)
280 IF NP(AO(I))=1 THEN 275
285 NP(AO(I))=1:NEXTI
290 CLS:PRINT@202,"DO YOU WANT":
PRINT@234,"'NOT GIVEN':PRINT@26
6,"AS A CHOICE":PRINT@297,"(Y)ES
OR (N)O?"
295 X$=INKEY$:IFX$="Y"THEN FS=0:
GOTO310
300 IFX$="N"THEN FS=1:GOTO310
305 GOTO295
310 IF HC=1THEN605
315 CLS:PRINT@169,"SELECT WIDTH"
:PRINT@233,"(A) WIDTH 32":PRINT@
265,"(B) WIDTH 40":PRINT@297,"(C
) WIDTH 80"
320 X$=INKEY$:IFX$=""THEN320
325 IFX$="A"THEN WIDTH 32:SW=31:
GOTO350
330 IFX$="B"THEN WIDTH 40:SW=39:
GOTO350
335 IFX$="C"THEN WIDTH 80:SW=79:
GOTO350
340 GOTO320
350 FOR P=1TOJ:GOSUB355:GOTO415
355 CLS
360 FORQ=1TO5:C(Q)=0:NEXT
365 FOR Q=1TO5-FS
370 C(Q)=RND(J):IF C(Q)=AO(P) TH
EN370
375 FOR K=Q-1 TO 0STEP-1:IF C(K)
=C(Q) THEN370
380 NEXTK
385 NEXTQ:C(5-FS)=AO(P)
390 FOR E=1TO5-FS
395 F(E)=RND(5-FS)
400 FOR K=E-1 TO 0 STEP-1:IF F(K)
=F(E) THEN395
405 NEXTK,E:RETURN
410 WIDTH SW+1
415 CLS:PRINT:JK$=" "+A$(AO(P)
):GOSUB195
420 PRINT

```

```

425 JK$=" 1-"+B$(C(F(1))):GOSUB1
95
430 IFSW<>31THENPRINT
435 JK$=" 2-"+B$(C(F(2))):GOSUB1
95
440 IFSW<>31THENPRINT
445 JK$=" 3-"+B$(C(F(3))):GOSUB1
95
450 IFSW<>31THENPRINT
455 JK$=" 4-"+B$(C(F(4))):GOSUB1
95
460 IF FS=1 THEN 475
465 IFSW<>31THENPRINT
470 JK$=" 5-NOT GIVEN":GOSUB195
475 G$=INKEY$:IFG$="@ "THEN535
480 IF G$=""THEN475
485 G=VAL(G$)
490 IF G<1 THEN 475
495 IF G>5-FS THEN 475
500 IF C(F(G))<>AO(P) THEN515
505 PRINT:JK$=" YOU ARE CORREC
T! THE ANSWER IS: "+B$(AO(P)):GO
SUB195
510 CR=CR+1:GOTO525
515 PRINT:JK$=" WRONG! THE COR
RECT ANSWER IS: "+B$(AO(P)):GOSU
B195
520 IR=IR+1
525 X$=INKEY$:IFX$<>CHR$(13)THEN

```



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```

525
530 NEXT P
535 WIDTH 32
540 CLS:PRINT:PRINT:PRINT
545 L=CR+IR:IF L=0 THEN L=1
550 PRINT"      NUMBER CORRECT = "
CR
555 PRINT
560 PRINT"      NUMBER WRONG  = "
IR
565 PRINT:PRINT"      STUDENT SCOR
E = ";INT(CR*100/L);"%
570 PRINT:PRINT"      ANOTHER TRY
(Y/N/C)";
575 W$=INKEY$:IF W$="" THEN 575
580 IF W$="Y" THEN RUN
585 IF W$="N" THEN END
590 IF W$="C" THEN 410
595 GOTO 575
600 REM ***** START HARDCOPY ***
605 CLS
610 CLS:GOTO 645
615 IF LEN(JK$)<=SW THEN 635
620 FOR T=SW TO 0 STEP -1:IF MID$(
JK$,T,1)=" " THEN 630
625 NEXT T:GOTO 635
630 L$=LEFT$(JK$,T):W$=L$:GOSUB 6
40:JK$="      "+RIGHT$(JK$, (LEN(J
K$))-T):GOTO 615
635 PRINT#-2,JK$:CR=CR+1:RETURN
640 PRINT#-2,W$:CR=CR+1:GOSUB 770
:RETURN
645 REM START PRINTING
650 CLS:PRINT@128,STRING$(32,"*
");:PRINT"SELECT (L)ARGE OR (S)MA
LL PRINT":PRINTSTRING$(32,"*");
655 P$=INKEY$:IF P$="" THEN 655
660 IF P$="L" THEN 675
665 IF P$="S" THEN 680
670 GOTO 655
675 SW=38:PL=46:TL=8:LL=21:PS=31
:GOTO 685
680 SW=76:PL=46:TL=14:LL=53:PS=3
0
685 PRINT:PRINTSTRING$(32,"*");:
PRINT"PRESS <ENTER> TO BEGIN PRI
NTING":PRINTSTRING$(32,"*");
690 P$=INKEY$:IF P$=CHR$(13) THEN
700
695 GOTO 690
700 PRINT#-2,CHR$(PS);" NAME";ST
RING$(LL,&H5F);"DATE";STRING$(TL
,&H5F)
705 PRINT#-2," TEST ON: ";B$(J+1
):PRINT#-2," ":CR=4
710 FOR P=1 TO J
715 GOSUB 355
720 JK$=ID$+STR$(P)+" . "+A$(AO(P
))+" "+STRING$(6,&H5F)+" ":GOSU
B 615
725 PRINT

```

```

730 JK$="      (1) "+B$(C(F(1))):GO
SUB 615:GOSUB 770
735 JK$="      (2) "+B$(C(F(2))):GO
SUB 615:GOSUB 770
740 JK$="      (3) "+B$(C(F(3))):GO
SUB 615:GOSUB 770
745 JK$="      (4) "+B$(C(F(4))):GO
SUB 615:GOSUB 770
750 IF FS=1 THEN 760
755 JK$="      (5) NOT GIVEN":GOSUB
615:GOSUB 770
760 GOSUB 770
765 PRINT#-2," ":GOSUB 770:NEXT P:
RUN
770 IF CR<=PL THEN RETURN
775 CLS:PRINT:PRINTSTRING$(32,"*
");:PRINTTAB(2)"ADVANCE PAPER TO
NEXT SHEET":PRINTTAB(3)"PRESS <
ENTER> TO CONTINUE"
780 PRINT" PRESS (N) FOR NEXT L
INE ONLY":PRINTSTRING$(32,"*");
785 P$=INKEY$:IF P$=CHR$(13) THE
N CR=0:RETURN
790 IF P$="N" THEN RETURN
795 GOTO 785
990 REM ENTER DATA AT LINE 1000
1000 DATA RED,COLOR OF THE SURFA
CE OF MARTIAN SOIL
1010 DATA VOLCANOES AND CRATERS,
WHAT THE SURFACE OF MARS IS COVE
RED WITH
1020 DATA THREE HUNDRED MILES WI
DE,THE WIDTH OF MARS LARGEST VOL
CANO
1030 DATA GALILEO, DISCOVERED TH
E MOONS OF JUPITER
1040 DATA ELEVEN,THE NUMBER OF E
ARTHS THAT WOULD FIT ACROSS THE
WIDTH OF JUPITER
1050 DATA THIRTEEN HUNDRED,NUMBE
R OF EARTHS THAT WOULD FIT INSID
E JUPITER
1060 DATA RED SPOT, A LARGE STOR
M ON THE SURFACE OF JUPITER
1070 DATA TEN HOURS,THE TIME IT
TAKES JUPITER TO ROTATE ONCE
1080 DATA 1 A.U. (ASTRONOMICAL U
NIT),DISTANCE FROM THE EARTH TO
THE SUN
1090 DATA VIKING,THE FIRST VEHIC
LE TO SOFT LAND ON MARS
1100 DATA ANY SIGNS OF LIFE.,WHA
T SCIENTISTS DIDN'T FIND ON MARS
1110 DATA PIONEER,FIRST VEHICLE
SENT TO JUPITER AND SATURN
1120 DATA VOYAGER 1 & 2,VEHICLES
SENT TO JOVIAN PLANETS
1130 DATA END,EXPLORING OUR SOLA
R SYSTEM
5000 DATA END,EXPLORING OUR SOLA
R SYSTEM

```


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*An electronic Valentine's card
for the one you love*

Wear Your Heart on Your Screen

By Brian Catlett



Valentine's Day is fast approaching — it's time to throw off your shyness and let that special person know how you really feel. But if the words get in your way, let *Valentine* and the CoCo speak for you.

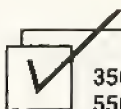
In order to use a fancy script type for the words, for visual appeal, I had to resort to writing a long series of DATA statements to print the words to the screen. In fact, the DATA statements take up more than one-third of the program and were laborious to write, let me tell you!

But love's labor is not lost! If, for some reason (extremely unlikely), your beloved is not bowled over by the expression of your sentiment, merely show him or her a listing of the program, pointing out that you had to exercise Herculean precision to ensure that every number in those DATA statements was copied accurately. That should do it.

After you have typed in and saved the program, run it. The screen should be red; if it is not, press the reset button and run again. And if anyone out there knows a way to make love's labor less tedious (how to get around all those DATA statements) without losing the effect, please write and let me know.

(Questions or comments about this program may be directed to the author at 6801 Mountain Rd., NE, Albuquerque, NM 87110. Please enclose an SASE when writing for a response.) □

Brian Catlett holds a degree in computer science from Widener University in Chester, Pennsylvania. He enjoys working with computer graphics and animation and is presently working for a drafting company.



35060 2060131
550145 2110222
830147 216025
2010125 END133

The listing: VALNTINE

```
10 *****
20 '*          H A P P Y          *
30 '*    V A L E N T I N E ' S    *
40 '*          D A Y              *
50 '* BY BRIAN CATLETT 1985      *
60 '*    BOX 297                  *
70 '*    WIDENER UNIVERSITY      *
80 '*    CHESTER, PA. 19013      *
90 *****
100 PCLEAR8:DIM H(5,31):RESTORE
110 PMODE4,1:PCLS1:SCREEN1,1
120 PMODE3:PCLS3
130 IF INKEY$="" THEN 130
140 PMODE4,1:PCLS1
150 W=2
160 FOR C=1TO400:NEXT
200 '* WRITE "HAPPY" *
210 FOR D=1TO191
220 READ X,Y
230 PSET (W*X+73,Y+2,0)
240 NEXT
250 '* WRITE "VALENTINES" *
260 FOR D=1TO228
270 READ X,Y
280 PSET(W*X+41,Y+30,0)
```

```
290 NEXT
300 '* WRITE "DAY" *
310 FOR D=1TO110
320 READ X,Y
330 PSET(W*X+89,Y+58,0)
340 NEXT
350 '* CHANGE SCREENS *
360 '* TO DRAW HEARTS *
370 PMODE4,5
380 PCOPY1TO5:PCOPY2TO6:PCOPY3TO
7:PCOPY4TO8
390 '* DRAW SMALL HEART *
400 CIRCLE(124,120),10,0,1,.4,.9
410 CIRCLE(140,120),10,0,1,.6,.1
420 CIRCLE(132,99),22,0,1.8,.13,
.38
430 POKE178,2
440 PAINT(128,120),,0
450 CIRCLE(124,120),10,,1,.4,.9
460 CIRCLE(140,120),10,,1,.6,.1
470 CIRCLE(132,99),22,,1.8,.13,.
38
480 GET(113,109)-(153,140),H,G
490 POKE178,3
500 LINE(113,109)-(151,140),PSET
,BF
510 '* DRAW LARGE HEART *
520 CIRCLE(104,120),30,0,1,.45,.
92
530 CIRCLE(112,124),18,0,1,.45,.
94
540 CIRCLE(152,120),30,0,1,.595,
.07
550 CIRCLE(144,124),18,0,1,.59,.
07
560 CIRCLE(128,72),64,0,1.6,.1,.
42
570 CIRCLE(128,38),51,0,2.4,.15,
.36
```

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```

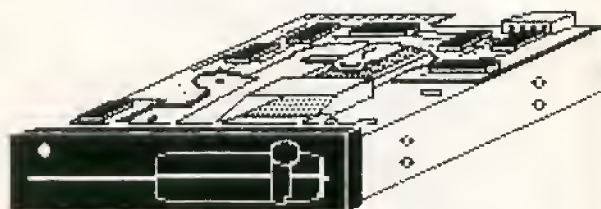
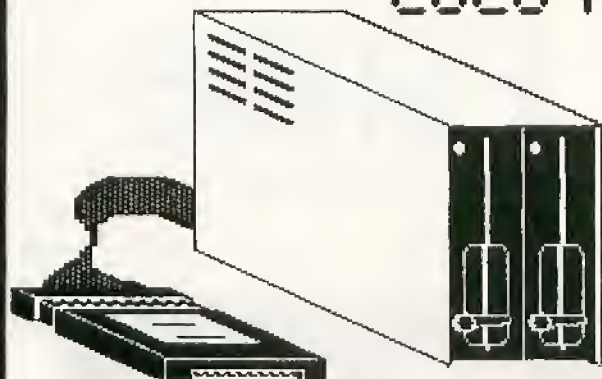
580 POKEL78,2
590 PAINT(128,105),,0
600 '* SWITCH SCREENS TO *
610 '* DISPLAY HEART *
620 PMODE4,5:SCREEN1,1
630 '* WRITE "WITH" *
640 FOR D=1TO80
650 READ X,Y
660 PSET(X+112,Y+122,0)
670 NEXT
680 '* WRITE "LOVE" *
690 FOR D=1TO46
700 READ X,Y
710 PSET(X+116,Y+136,0)
720 NEXT
730 '* PUT HEARTS ON SIDES *
740 PUT(1,1)-(41,32),H,AND
750 PUT(215,1)-(255,32),H,AND
760 PUT(1,70)-(41,101),H,AND
770 PUT(215,70)-(255,101),H,AND
780 PUT(21,139)-(61,170),H,AND
790 PUT(195,139)-(235,170),H,AND
800 '* SWITCH SCREENS TO *
810 '* DRAW EXPANDED HEART *
820 PCOPY5TO1:PCOPY6TO2:PCOPY7TO
3:PCOPY8TO4
830 PMODE4,1
840 POKEL78,2
850 CIRCLE(104,120),30,,1,.45,.9
2
860 CIRCLE(152,120),30,,1,.595,.
07
870 CIRCLE(128,72),64,,1.6,.1,.4
2
880 CIRCLE(103,120),40,0,1,.45,.
86
890 CIRCLE(153,120),40,0,1,.65,.
07
900 CIRCLE(128,69),74,0,1.6,.1,.
42
910 PAINT(128,95),,0
920 '* FLIP BETWEEN BOTH *
930 '* SCREENS TO MAKE *
940 '* HEART PULSE *
950 PMODE4,1:SCREEN1,1
960 FORD=1TO500:NEXT
970 PMODE4,5:SCREEN1,1
980 FORD=1TO500:NEXT
990 GOTO950
1000 GOTO1000
2000 'DATA FOR "HAPPY"
2010 DATA 0,1,1,0,2,0,3,1,2,2,1,
1,3,0,4,1,4,2,4,3,4,4,4,5,3,6,3,
7,3,8,3,9,2,10,2,11,2,12,2,13,1,
14,1,15,12,0,12,1,11,2,11,3,10,4
,10,5,10,6,10,7,9,8,9,9,9,10,9,1
1,8,12,8,13,8,14,8,15,8,7,7,6,6,
6,5,6,4,7,4,8,5,9,6,9,7,9,8,9,10
,9,11,9,12,8
2020 DATA 17,10,16,9,15,9,14,10,
13,11,13,12,13,13,13,14,14,15,15
,15,16,15,17,14,18,13,18,12,18,1
1,18,10,19,9,18,14,19,15,20,15,2
1,15,22,14,23,13,23,12,24,11,24,
10,24,9,23,14,23,15,23,16,22,17,
22,18,21,19,21,20,21,21,20,22,19
,21,19,20,19,19,20,18
2030 DATA 20,17,21,16,22,15,25,1
0,26,9,27,9,28,10,29,11,29,12,29
,13,28,14,27,15,26,15,25,15,24,1
4,28,15,29,15,30,15,31,15,32,14,
33,13,33,12,34,11,34,10,34,9,33,
14,33,15,33,16,32,17,32,18,31,19
,31,20,31,21,30,22,29,21,29,20,2
9,19,30,18,30,17
2040 DATA 31,16,32,15,35,10,36,9
,37,9,38,10,39,11,39,12,39,13,38
,14,37,15,36,15,35,15,34,14,38,1
5,39,15,40,15,41,15,42,14,43,13,
43,12,44,11,44,10,45,9,46,9,47,1
0,47,11,47,12,46,13,46,14,47,15,
48,15,49,14,50,13,50,12,51,11,51
,10,51,9,51,12,51,13
2050 DATA 51,14,50,15,50,16,49,1
7,49,18,49,19,48,20,48,21,47,22,
46,21,46,20,46,19,47,18,47,17,48
,16,49,15,50,14,52,12,53,11,54,1
0,55,10
2060 'DATA FOR "VALENTINE'S"
2070 DATA 0,1,1,0,2,0,3,1,2,2,1,
1,3,0,4,1,4,2,5,3,5,4,6,5,6,6,6,
7,6,8,6,9,5,10,5,11,5,12,5,13,4,
14,4,15,5,15,6,15,7,15,8,14,9,13
,9,12,10,11,10,10,10,9,10,8,11,7
,11,6,11,5,11,4,12,3,12,2,13,1,1
4,0,15,0
2080 DATA 18,10,17,9,16,9,15,10,
14,11,14,12,14,13,14,14,15,15,16
,15,17,15,18,14,19,13,19,12,19,1
1,19,10,20,9,19,14,20,15,21,15,2
2,15,23,14,24,13,25,12,25,11,26,
10,26,9,26,8,26,7,27,6,27,5,27,4
,27,3,27,2,26,1,26,0,25,0,24,1,2
4,2,24,3
2090 DATA 23,4,23,5,23,6,23,7,23
,8,23,9,23,10,23,11,23,12,25,14,
26,15,27,15,28,15,29,14,30,13,31
,12,32,11,32,10,31,9,30,9,30,10,
29,11,29,12,31,14,32,15,33,15,34
,15,35,14,36,13,36,12,36,11,37,1
0,38,9,39,9,40,10,40,11,40,12,39
,13,39,14,39,15
2100 DATA 41,10,42,9,43,9,44,10,
44,11,43,12,43,13,43,14,44,15,45
,15,46,15,47,14,48,13,48,12,48,1
1,49,10,49,9,49,8,49,7,49,6,49,5
,50,4,50,3,49,14,50,15,51,15,52,
15,53,14,54,13,54,12,55,11,55,10
,55,9,55,14,56,15,57,15,58,15,59
,14,60,13
2110 DATA 60,12,60,11,61,10,62,9
,63,9,64,10,64,11,64,12,63,13,63

```


,14,63,15,65,10,66,9,67,9,68,10,
68,11,67,12,67,13,67,14,68,15,69
,15,70,15,71,14,72,13,73,12,74,1
1,74,10,73,9,72,9,72,10,71,11,71
,12,73,14,74,15,75,15,76,14,77,6
,77,7,78,8,78,9
2120 DATA 79,15,80,14,81,13,82,1
2,82,11,83,10,83,9,84,9,85,10,86
,11,86,12,85,13,84,14,83,15,82,1
5,81,14,84,15,85,15,86,15,87,14,
46,8,47,7,48,7,49,7,50,7,51,7,52
,6,55,7
2130 'DATA FOR "DAY"
2140 DATA 10,0,9,0,8,1,7,2,7,3,6
,4,6,5,6,6,5,7,5,8,5,9,5,10,4,11
,4,12,4,13,3,14,2,15,1,15,0,14,1
,13,2,13,4,15,5,15,6,15,7,15,8,1
5,9,15,10,14,11,13,12,12,12,11,1
3,10,13,9,14,8,14,7,14,6,14,5,14
,4,13,3,13,2,12,1,11,0,9,2,10,2,
11,2,13,0
2150 DATA 21,10,20,9,19,9,18,10,
17,11,17,12,17,13,17,14,18,15,19
,15,20,15,21,14,22,13,22,12,22,1
1,22,10,23,9,22,14,23,15,24,15,2
5,15,26,14,27,13,27,12,28,11,28,
10,29,9,30,9,31,10,31,11,31,12,3
0,13,30,14,31,15

2160 DATA 32,15,33,14,34,13,34,1
2,35,11,35,10,35,9,35,12,35,13,3
5,14,34,15,34,16,33,17,33,18,33,
19,32,20,32,21,31,22,30,21,30,20
,30,19,31,18,31,17,32,16,33,15,3
4,14,36,12,37,11,38,10,39,10
2170 'DATA FOR "WITH"
2180 DATA 0,1,1,0,2,0,2,1,1,1,3,
1,3,2,3,3,3,4,2,5,2,6,2,7,1,8,0,
9,1,9,2,9,3,8,4,7,5,6,5,5,6,4,6,
3,6,5,6,6,6,7,6,8,7,8,8,7,9,6,9,
5,10,4,10,3,11,2,12,7,13,6,14,5,
14,4,14,3,15,6
2190 DATA 16,6,17,5,18,4,18,3,18
,2,19,1,19,0,19,-1,19,-2,19,5,20
,5,21,4,22,3,23,2,24,1,24,0,25,-
1,25,-2,25,-3,24,-4,23,-3,23,-2,
23,-1,23,0,23,1,23,2,23,3,23,4,2
4,1,25,1,26,2,26,3,27,4,28,4,29,
3,14,1,17,1,18,0,19,0,20,0,21,-1
2200 'DATA FOR "LOVE"
2210 DATA 0,0,1,1,1,2,1,3,1,4,1,
5,1,6,0,7,2,6,3,6,4,7,5,7,6,6,10
,2,9,2,8,3,8,4,8,5,9,6,10,6,11,5
,11,4,11,3,12,2,13,1,14,2,14,3,1
4,4,15,5,16,5,17,4,17,3,17,2,17,
1,18,1,19,2,20,2,21,2,22,1,21,0,
20,1,20,3,21,4,22,4,23,4,24,3

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- ✓ Dynamic memory allocation.

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Control Change
Channel Pressure
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Follow the Bread Crumbs

By Dennis H. Weide

Since the publication of my article "The CoCo Writes A Program" (July 1987, Page 84), many people have written to me with questions. Some say they have machine language programs on disk, but don't have the addresses of the programs. Well, believe it or not, Tandy left you some bread crumbs on disk (just like in the fairy tale) that will lead you to the addresses you want.

On cassette-based systems, the addresses are stored in RAM.

Load the ML program into memory and use the following PEEK commands to find the required addresses:

Start Address

PEEK(487)*256+PEEK(488)

End Address

PEEK(126)*256+PEEK(127)

Exec Address

PEEK(157)*256+PEEK(158)

Disk Extended BASIC doesn't store all the addresses in memory after loading the program. They're stored in the file on disk as shown in Figure 1. The top part of the figure shows a machine language program file in its

binary format, as it is stored on disk. The bottom part shows a BASIC program file in its tokenized format. We'll be using the top part of the figure for this discussion. The bottom portion is included for reference. Note that Figure 1 represents the program file on disk, and byte numbers are determined by the length of the file.

The first byte (Byte 1) of an ML program file is always zero — this is how Disk BASIC determines whether the file specified in the LOADM command is a machine language program file. For a BASIC program, Byte 1 is always 255.

The second and third bytes (bytes 2 and 3) of the ML program file are the most significant byte (MSB) and least significant byte (LSB) of the file size. These two bytes tell Disk BASIC how many bytes of program code are actually stored in the file.

The fourth and fifth bytes (bytes 4

and 5) are the MSB and LSB of the start address pointer. These two bytes point to the start address of the ML program, where Disk BASIC will load the first byte of program code.

The sixth byte (Byte 6) is the first byte of the program code that will be loaded into the start address, indicated by the start address pointer.

Disk BASIC continues to load each successive byte into memory until it reaches the end of the program file. In Figure 1, the last byte of program code is Byte 11. The last five bytes (bytes 12 through 16) of an ML program file contain the end-of-program marker and the execute address. The fifth, fourth and third bytes (bytes 12, 13 and 14) from the end of the file always contain 255-0-0, indicating the end of the binary file.

Machine Language Program Disk Storage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PGM TYPE	PGM CODE SIZE		START ADDRESS		VARIABLE LENGTH PROGRAM CODE						END OF PRGM		EXECUTE ADDRESS		
ML=0	MSB	LSB	MSB	LSB	VAR	VAR	VAR	VAR	VAR	VAR	255	0	0	MSB	LSB

BASIC Program Disk Storage

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PGM TYPE	NUMBER OF CODE BYTES		NEXT LINE POINTER		LINE NUMBER		VARIABLE LENGTH PROGRAM CODE				EOLN		EOF		
B=255	MSB	LSB	MSB	LSB	MSB	LSB	VAR	VAR	VAR	VAR	VAR	VAR	0	0	0

B BASIC
EOF END OF FILE MARKER
EOLN END OF LINE MARKER
LSB LEAST SIGNIFICANT BYTE

ML MACHINE LANGUAGE
MSB MOST SIGNIFICANT BYTE
VAR VARIABLE BYTE VALUES
1-16 BYTE NUMBER

Figure 1: Disk file storage

Dennis Weide is a communications technician for AT&T in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching computer programming.

The last two bytes (bytes 15 and 16) are the MSB and LSB of the execute address pointer. This is the address the processor jumps to when the program is executed from BASIC using the EXEC command or USR function. The programs in listings 1 and 2 follow the bread crumbs for you.

The program in Listing 1 is a BASIC program that prompts you for a filename and then reads the first byte of the file to determine if it's an ML program file. If it's not, the program jumps to Line 7000 and prints "Not a binary file." If it is an ML file, the program reads the file length in bytes 2 and 3 and the start address in bytes 4 and 5. Then it performs the following calculations to determine program size and the start, end, and execute addresses:

```

Program Size
  BYTE2 * 256 + BYTE3
Start Address
  BYTE4 * 256 + BYTE5
End Address
  START ADDR + PGM SIZE - 1
Exec Address
  (PGM SIZE + 9) * 256 + (PGM
  SIZE + 10)

```

When all these calculations are complete, the results are printed on the screen in decimal and hexadecimal format. The last line, "Total bytes," is the program size — not the file size. The program size is always smaller than the file size, because the pointers and end-of-file (EOF) markers are not loaded into memory.

The program in Listing 2 is the PAS-

CAL source code for the same program. It was written using Deft PASCAL and compiled into a machine language program. The addresses of the version provided for RAINBOW ON TAPE/DISK are as follows:

Function	Dec	Hex
Start Address	20000	4E20
End Address	24980	6194
Exec Address	20000	4E20

The ML code produced by the Deft compiler is fully relocatable, so you can load it into memory anywhere you want. It's always a good idea to protect memory where an ML program is loaded by using the CLEAR command.

Each version has its own advantages and disadvantages. The BASIC version will be erased from memory each time another BASIC program is loaded. But it can be appended to other BASIC disk utilities. The PASCAL version can be loaded into protected memory and executed whenever it's needed, but it executes slower than the BASIC version because PASCAL doesn't allow direct reading of disk tracks and sectors as BASIC does.

Both programs contain remarks to help you understand how they function, but it's not necessary to type in these remarks in either listing. After you've chosen the version you will use and have saved it to disk, you can test the program by entering the filename of an ML program stored on disk for which addresses are known. Be sure to include the drive name in the filename if you have more than one drive. You can

create a dummy test file by entering the following:

```
SAVEM~JUNK~BIN:0~,5000,6000,
5500
```

This is not a working program but a dummy file to verify that your program works properly, so be sure to kill it after you've completed the test. When you enter JUNK~BIN:0 at the filename prompt, the following screen message should be displayed:

```

JUNK~BIN:0

FUNCTION      DEC      HEX
START ADDRESS 5000     1388
END ADDRESS   6000     1770
EXEC ADDRESS   5500     157C
TOTAL BYTES    1001     03E9

```

If other addresses are displayed, check the program for typing errors.

The information I've provided here should come in handy for those who want to expand their programming knowledge or better understand how files are stored on disk. This information applies to Radio Shack Disk Extended Color BASIC versions 1.0 and 1.1, and any RS-DOS compatible operating system. It will not work on OS-9 operating systems.

It's always a pleasure to hear from people who find my articles interesting. So, if you have any questions or suggestions, please feel free to write me.

(You may write to Dennis Weide at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when requesting a reply.) □

Listing 1: ADRESBAS

```

1000 '      FINDADDR PROGRAM          14000 '
2000 '      BY DENNIS H. WEIDE         15000 '      OPEN FILE TO READ
3000 '                                     16000 '      A BYTE AT A TIME
4000 '      THIS PROGRAM WILL READ    17000 '
5000 '      THE START, END AND EXE     18000 OPEN "D",#1,F$,1
6000 '      C                          19000 FIELD #1,1 AS A$
7000 '      ADDRESSES OF AN ML PRO    20000 '
8000 '      GRAM                      21000 '      READ FIRST BYTE TO
9000 '      FROM DISK AND PRINT TH    22000 '      SEE IF FILE IS AN
10000 '      E                        23000 '      ML BINARY FILE
11000 '      RESULTS ON THE SCREEN    24000 '
12000 '      9000 GET #1,1            25000 GET #1,1
13000 '      10000 IF ASC(A$)>0 THEN 70000 26000 IF ASC(A$)>0 THEN 70000
14000 '      11000 CLS                27000 '
15000 '      12000 LINEINPUT"ENTER FILENAME > 28000 '      READ BYTES 4 AND 5
16000 '      ";F$                     29000 '      AND CALCULATE THE
17000 '      13000 CLS                 30000 '      START ADDRESS

```



```

31000 '
32000 GET #1,4
33000 SA=ASC(A$)*256
34000 GET #1,5
35000 SA=SA+ASC(A$)
36000 '
37000 ' READ BYTES 2 AND 3 AND
38000 ' CALCULATE PROGRAM SIZE
39000 '
40000 GET #1,2
41000 PS=ASC(A$)*256
42000 GET #1,3
43000 PS=PS+ASC(A$)
44000 '
45000 ' CALCULATE END ADDRESS
46000 '
47000 EA=SA+PS-1
48000 '
49000 ' LOCATE LAST TWO BYTES
50000 ' OF FILE AND CALCULATE
51000 ' EXECUTE ADDRESS
52000 '
53000 GET #1,PS+9
54000 EX=ASC(A$)*256

55000 GET #1,PS+10
56000 EX=EX+ASC(A$)
57000 CLOSE#1
58000 '
59000 ' PRINT RESULTS TO SCREEN
60000 '
61000 PRINT F$
62000 PRINT
63000 PRINT "FUNCTION DEC
        HEX"
64000 PRINT "-----
        -----"
65000 PRINT "START ADDRESS ";SA
        ";";HEX$(SA)
66000 PRINT "END ADDRESS ";EA
        ";";HEX$(EA)
67000 PRINT "EXEC ADDRESS ";EX
        ";";HEX$(EX)
68000 PRINT "TOTAL BYTES ";EA
        "-SA+1;";";HEX$(EA-SA+1)
69000 END
70000 PRINT F$;PRINT:PRINT "NOT A
        BINARY FILE"

```

Listing 2: ADRESPAS

```

PROGRAM FINDADDR(INPUT,OUTPUT);

(* WRITTEN BY DENNIS H. WEIDE *)
(* PROGRAM TO FIND START, END, & EXEC ADDRESS *)
(* OF MACHINE LANGUAGE PROGRAM. TRS-80 COCO *)

(* DECLARE ALL VARIABLES *)

VAR FILENAME,ADDRESS1,ADDRESS2,ADDRESS3,ADDRESS4:STRING;
    FILE1:TEXT;
    BITE1,BITE2,BITE3:CHAR;
    PGMSIZE,START,FINISH,EXEC,COUNT:INTEGER;

(* START OF MAIN PROGRAM *)

BEGIN
    PAGE;
    WRITE('ENTER FILENAME > ');
    READLN(FILENAME);
    PAGE;

    (* OPEN FILE TO BE READ *)
    (* ONE BYTE AT A TIME *)

    RESET(FILE1,FILENAME);

    (* READ BYTES 1,2,3 TO SEE *)
    (* IF THIS IS AN ML BINARY *)

```



```

(*) FILE. *)

READ(FILE1,BITE1,BITE2,BITE3);

(*) IF THIS IS AN ML BINARY *)
(*) FILE, START HERE TO *)
(*) CALCULATE PROGRAM SIZE *)

IF BITE1=CHR(0) THEN BEGIN
    PGMSIZE:=ORD(BITE2)*256+ORD(BITE3);

(*) READ BYTES 3 AND 4 AND *)
(*) CALCULATE START ADDRESS *)

    READ(FILE1,BITE1,BITE2);
    START:=ORD(BITE1)*256+ORD(BITE2);

(*) CALCULATE END ADDRESS *)

    FINISH:=START+PGMSIZE-1;

(*) READ ALL BYTES UNTIL THE *)
(*) LAST TWO FILE BYTES ARE *)
(*) FOUND. *)

    FOR COUNT:=1 TO PGMSIZE+3 DO READ(FILE1,BITE1);

(*) READ LAST TWO FILE BYTES *)
(*) AND CALCULATE EXECUTE *)
(*) ADDRESS. *)

    READ(FILE1,BITE2,BITE3);
    WRITELN;
    EXEC:=ORD(BITE2)*256+ORD(BITE3);

(*) COMPUTE ALL HEXIDECIMAL *)
(*) ADDRESSES. *)

    WORD[1024]:=START;
    HEX(1024,2,ADDRESS1);
    WORD[1024]:=FINISH;
    HEX(1024,2,ADDRESS2);
    WORD[1024]:=EXEC;
    HEX(1024,2,ADDRESS3);
    WORD[1024]:=PGMSIZE;
    HEX(1024,2,ADDRESS4);

(*) PRINT RESULTS TO SCREEN *)

    PAGE;
    WRITELN(FILENAME);
    WRITELN;
    WRITELN('FUNCTION          DEC      HEX');
    WRITELN('-----');
    WRITELN('START ADDRESS  ',START,' ',ADDRESS1);
    WRITELN('END ADDRESS    ',FINISH,' ',ADDRESS2);
    WRITELN('EXEC ADDRESS   ',EXEC,' ',ADDRESS3);
    WRITELN('TOTAL BYTES    ',PGMSIZE,' ',ADDRESS4)
END
ELSE WRITELN('NOT A BINARY FILE');
END.

```


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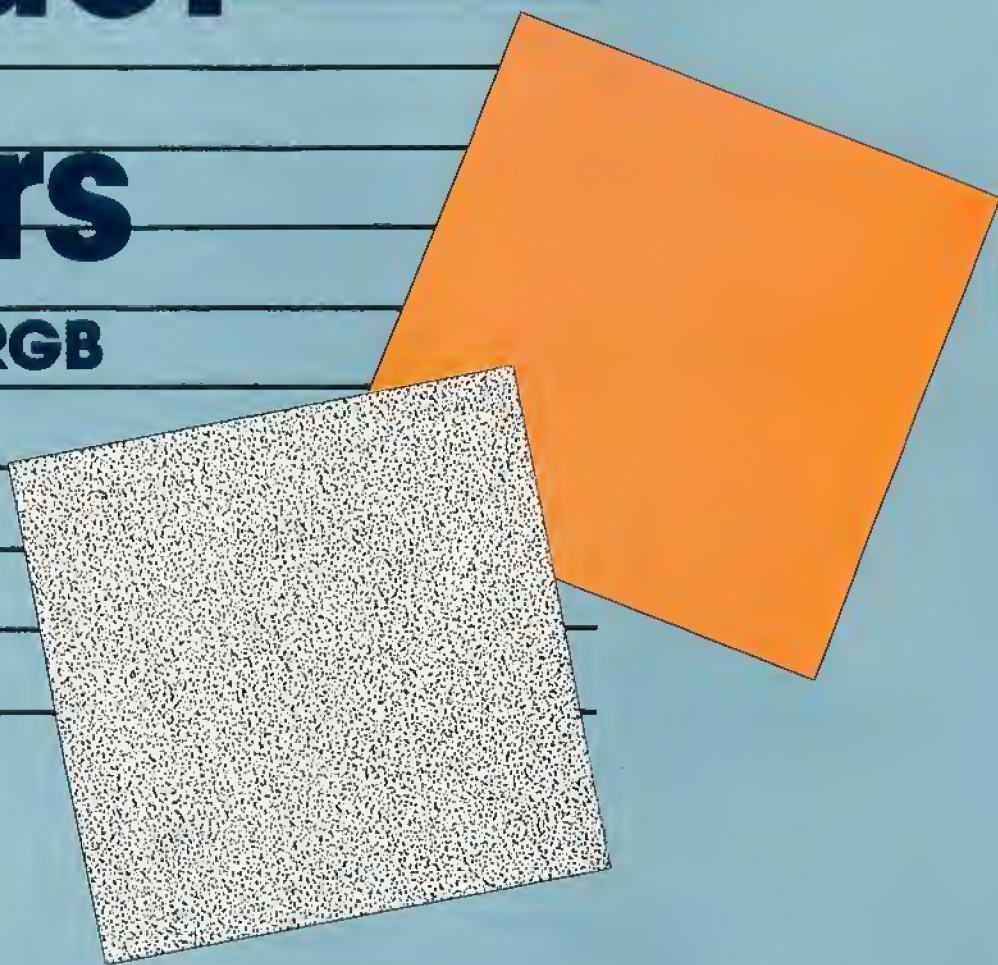
A patch to display CoCo 1 and 2 colors on the CM-8 monitor

Artifact

Colors

on CoCo 3's RGB

By Steven M. Ostrom



Because of all the concern over artifact colors not being displayed on the CM-8 monitor when the CoCo 3 runs older machine language programs, I decided to create *Patch*. This BASIC program, along with

Steve Ostrom is a 38-year-old father of two girls who love the CoCo. He has written numerous programs, including the Adventure SHIPWREK, the ML game STYX, and a variety of BASIC games and utilities, both commercial and in the public domain.

its three machine language subroutines, helps display color on the CM-8 monitor.

Patch modifies the existing machine language program that uses artifact colors, searching the program for all occurrences of the sequence FF22. It then checks to see if the STA or STB commands precede this reference to the PIA register. If so, *Patch* then inserts a call to a small routine placed in upper memory that checks to see if the PMODE being attempted is either 2 or 4.

What this routine does is change the

PMODE to either 1 or 3, which will let you see the game in full color. The graphics may appear slightly coarser, though. The program is not foolproof. It works in most cases, but sometimes the patch just won't work. In a few instances, however, when it appeared to fail, a press of the reset button started everything up and the program ran fine with color.

Patch is self-explanatory. Just load it and run. It first initializes the proper color slots for the RGB monitor and sets up the machine language routines.

You are then told to load your artifacting machine language program (do not type EXEC), and to type GOTO 290. You will be prompted to press the ENTER key, and you might notice three values displayed briefly in the upper left-hand corner of the screen. These are the number of occurrences found in the ML program of a possible PMODE change.

The value next to the question marks represents the occurrences of references to \$FF22, without either STA or STB just prior. These may need to be examined further using the *Look* program. *Patch* modifies all occurrences of STA and STB whenever PMODEs 2 and 4 are called. You must do this every time you want to load an ML program.

Patch will not work if the programmer did some unusual things while setting up the PMODE screens. Also, it won't work on BASIC programs, copy-protected programs or ROM packs. It

works only on machine language programs that load between &H1900 and &H7FE0. This is a range large enough that it should include most programs.

My second program to help in artifacting colors for RGB monitors is *Look*. It's a BASIC program that scans machine language programs and prints out the locations of all possible writes to Register \$FF22. You can examine these locations in more detail with an editor/assembler/debugger utility.

If you are proficient in using a debugging utility such as ZBUG, you can also make permanent changes to many machine language programs that work with *Patch*. When you find the areas that store a number into \$FF22, just replace this number with the same number ANDed with &HEF. This sets Bit 4 of Register \$FF22 to zero, and changes the PMODE from 4 to 3 or from 2 to 1. All you need to do then is save

this copy. It will now always run with color on your CM-8 without needing to run *Patch* each time.

(Questions or comments regarding this program may be directed to the author at 12612 Cedar Lake Road, Minnetonka, MN 55343. Please enclose an SASE when requesting a reply.)

Editor's Note: The following machine language programs from T & D Subscription Software have been tested with Patch to display colors when run on a CoCo 3 and CM-8 monitor: Panzer, Mrs. Pac, Foot Racer, Raider, Fire Runner, Flippy and Able. If you find other ML programs to work properly with Patch, please send us a list of the program names, along with the companies presently selling the program. We will print updated lists for our readers in upcoming issues. □

Listing 1: PATCH

```

10 'PATCH
20 'COPYRIGHT 1987
30 'STEVE OSTROM
40 '12612 CEDAR LAKE ROAD
50 'MINNETONKA, MN 55343
60 '612-546-7608
70 '
80 PCLEAR1
90 CLEAR14,&H1900
100 RGB
110 PALETTE 4,0
120 PALETTE 5,9
130 PALETTE 6,36
140 PALETTE 7,63
150 FORX=&H7FE0 TO &H7FE9
160 READA$
170 POKE X,VAL("&H"+A$)
180 NEXT X
190 FORX=&H7FF0 TO &H7FF9
200 READA$
210 POKE X,VAL("&H"+A$)
220 NEXT X
230 FORX=&H7F70 TO &H7FDB
240 READA
250 POKE X,A
260 NEXT X
270 CLS:PRINT"NOW LOADM YOUR ML
PROGRAM.":PRINT:PRINT"WHEN DONE,
TYPE: GOTO 290"
280 END
290 A=PEEK(&H9D)*256+PEEK(&H9E)
300 CLS:PRINT"LDA=":PRINT@32,"LD
B=":PRINT@64,"???"
310 PRINT:INPUT"PRESS <ENTER>";A
$
320 EXEC&H7F70

```

```

330 PRINT:INPUT"PRESS <ENTER> TO
START PROGRAM";A$
340 EXECA
350 DATA 81,C0,25,05,84,EF,B7,FF
,22,39
360 DATA C1,C0,25,05,C4,EF,F7,FF
,22,39
370 DATA 134,48,167,141,0,43,167
,141,0,40,167,141,0,37,142,25,0,
141,33,16,174,128,140,127,112,39
,46,16,140,255,34,38,240,166,30,

```

Hint...

Taking Care of CoCo 3 Bugs

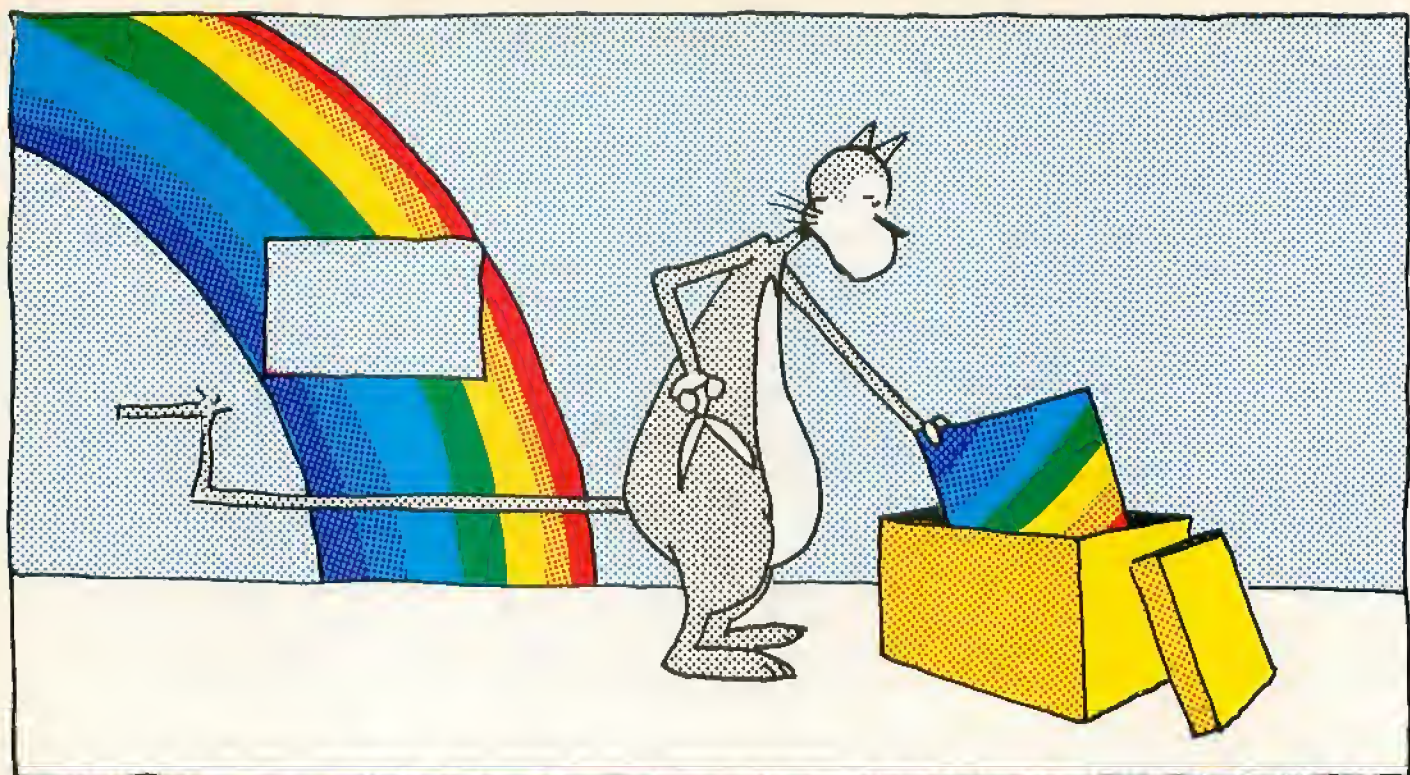
In theory, when you specify a value greater than 23 and less than 256 to the vertical coordinate of the HPRINT command, the CoCo 3 BASIC should draw the characters on Line 23 on the screen (the bottom line). In practice, however, a value greater than 23 but less than 127 causes BASIC to draw the characters on the first (top) line. Further, when the value is greater than 151 (which, by the way, is equal to 128+23), the characters are drawn right off the displayed screen, causing BASIC to crash randomly.

What is happening is that BASIC is taking the entered eight-bit value and performing a signed comparison on it to determine whether or not it is lower than the maximum allowable value. As a result, any integer greater than 127 is considered negative and, therefore, passes the range test. When the value goes over 151, BASIC starts to draw the characters into the RAM space reserved for BASIC code, which causes the system to crash.

The solution to this problem is simple: Convert the signed comparison to an unsigned comparison. To do this, just issue POKE&HEF92,&H24 from BASIC.

*See Pg 14, APR 88 RB
For Correction to above.*

Roger Bouchard
(HARBIE)
Montreal, Quebec



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129,183,39,35,129
 38 DATA 247,39,48,108,141,0,4,3
 2,224,255,255,255,166,141,255,24
 9,183,4,4,166,141,255,243,183,4,
 36,166,141,255,237,183,4,68,57,1

34,189,167,30,16,142
 39 DATA 127,224,16,175,31,108,1
 41,255,216,32,182,134,189,167,30
 ,16,142,127,240,16,175,31,108,14
 1,255,200,32,165,999

Listing 2: LOOK

```
10 'LOOK
20 'COPYRIGHT 1987
30 'STEVE OSTROM
40 '12612 CEDAR LAKE ROAD
50 'MINNETONKA, MN 55343
60 '612-546-7608
70 '
80 PCLEAR1
90 CLEAR14,&H1900
100 RGB
110 PALETTE 4,0
120 PALETTE 5,9
130 PALETTE 6,36
140 PALETTE 7,63
150 CLS:PRINT"LOADM THE PROGRAM
TO TEST":PRINT:PRINT"THEN TYPE:
GOTO 160":STOP
160 CLS
170 DA=0
180 DB=0
190 DC=0
200 FORX=&H36AD TO &H3E0A
```

```
210 PRINT0,HEX$(X)
220 A=PEEK(X)
230 IFA<>&HFF THEN380
240 A=PEEK(X+1)
250 IFA<>&H22 THEN380
260 A=PEEK(X-1)
270 IFA=&HB7 THEN320
280 IFA=&HF7 THEN350
290 DC=DC+1
300 PRINT#-2,HEX$(X);" ??? "
310 GOTO380
320 DA=DA+1
330 PRINT#-2,HEX$(X);" LDA "
340 GOTO380
350 DB=DB+1
360 PRINT#-2,HEX$(X);" LDB "
380 NEXTX
390 CLS:PRINT"LDA=";DA:PRINT#-2,
"LDA=";DA
400 PRINT"LDB=";DB:PRINT#-2,"LDB
=";DB
410 PRINT"???" ;DC:PRINT#-2,"???"
=";DC
```



CINSOFT

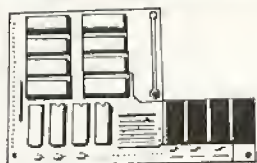
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*The hazards of spending long hours
at the computer*

A Healthy Interface Body Maintenance and Computing

By Laurence D. Preble

What began as a trickle in the late '70s has now become a flood. I'm talking about the increasing flow of patients who come to me with complaints directly attributable to long hours spent in front of a computer.

At first, "computer casualties" came mainly from the work place. But more and more often now I see problems stemming from long hours of computing in the home.

I admit it. There have been occasions when I actually spent more time at home in front of the computer than I did at work. (Thanks, Peg, you're a sweetheart to put up with it all.) Some of my most creative work comes at 2 o'clock in the morning. Those "simple" programming problems always take at least five times longer than expected to debug. But I am not the only guilty one — home computing has become a serious business.

Laurence D. Preble, D.C., a graduate of Vanderbilt University and Logan College of Chiropractic, has been a practicing chiropractor since 1978 and an avid computer programmer since 1969. He built his first computer in 1976. The Radio Shack Color Computers have been his favorite home computers since 1982.

The consequences of long hours at the computer are also serious business. Essentially, computing stresses three systems: the *eyes*, the *spine* and the *nervous system*.

The Eyes

Perhaps the best-known consequence of long computing sessions is eye strain. Some display devices are notoriously hard to read. Many LCD Screens (*Liquid Crystal Displays*) fit this category. Computers that use a TV as a display device can also strain the eyes if the characters displayed are too small.

Several popular programs for the CoCo try to squeeze up to 85 columns of characters across and 24 lines down a TV screen! The problem is that TV sets and even *composite video monitors* have very limited resolution capacities. If more than 40 columns of characters are displayed across the screen, the letters and numbers begin to blur. CoCo 3 circumvents this problem by allowing the use of a high resolution *RGB monitor*. Good quality RGB monitors easily handle 80 columns across and 24 or more lines down the face of the tube, even displayed in color.

If it is necessary to use composite video, a high resolution monochrome monitor will give the best results for text-oriented applications.

If the only display device available is the venerable television set, here are a few actions you can take to reduce the chance of eye strain: Limit the display to 40 characters across and no more than 16 lines down. If you want to push this limit a bit, turn the color control on the TV all the way down so that the display is black and white. By removing the color (or by using a black-and-white TV), you will notice that the text display appears sharper. With a very good TV set, you may be able to display up to 51-by-24 characters with relative viewing ease.

Inadequate lighting can also play a role. Computing usually involves reading, from both a VDT and hard copy, or paper printouts. The lighting in the work area should be bright enough to provide good contrast when reading paper printouts. If the display device is an LCD screen, the lighting is vitally important as the screen emits no light of its own. More commonly, a CRT (*Cathode Ray Tube*) is used as a display device. It is important to shield this kind of display from too much light. Light reflected from the CRT can decrease contrast or wash out the display and also produce a distracting glare. Glare shields and proper arrangement of the lighting can help.

Some recent visual research has sug-

gested another potential problem. It appears that hour upon hour of reading provides inadequate stimulation to the peripheral vision (side vision). The fovea centralis (center area of vision on the retina) is, however, highly stimulated by reading. The consequences of this limited stimulation actually affects the growth of the eye! The eye lengthens and causes light to be focused in front of the retina rather than precisely on its surface, resulting in myopia or near-sightedness. Have you ever noticed that people who are avid readers seem to wear glasses more often than not? There is a developing body of evidence to lend credence to this observation.

Unfortunately, the studies I read merely reported their findings without recommending any solutions to the problem. Until more research is completed, we are left with "common sense" suggestions. So take frequent breaks from reading and computing. A walk outdoors provides excellent peripheral vision stimulation and is a wonderful stress reducer, as well.

It is best to act quickly if you discover any visual problems. Consult a vision specialist on a regular basis. Your optometrist or ophthalmologist may have specific suggestions for reducing eye strain during your long hours at the keyboard.



The seat of this kneeling chair tips the pelvis forward to help maintain good sitting posture.

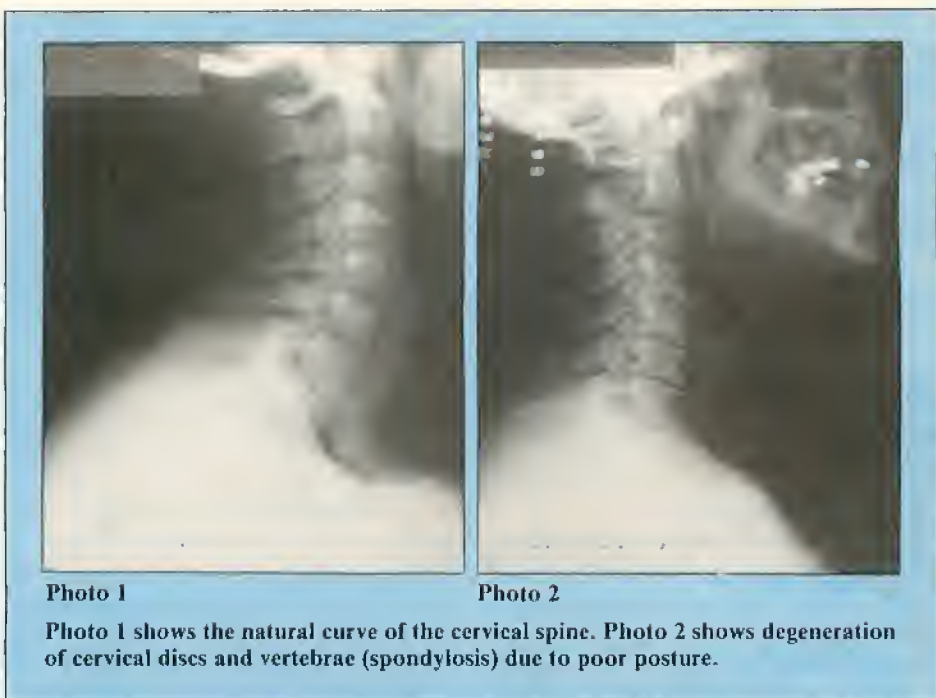


Photo 1

Photo 2

Photo 1 shows the natural curve of the cervical spine. Photo 2 shows degeneration of cervical discs and vertebrae (spondylosis) due to poor posture.

The Spine

Computing normally requires a sitting posture, a position that can have serious consequences for your back and neck. The quality of your sitting posture can affect your computing endurance and, ultimately, your health. Often, 40 hours of sitting puts more strain on the spine than 40 hours of standing.

Good sitting posture supports the three natural curves of the spine (*cervical*, *thoracic* and *lumbar*) in their normal, balanced alignment. When you slouch, the induced strain can lead to stiffness, backache, muscle fatigue, headache and even degenerative changes. The lumbar curve (lower back) bears most of the strain of sitting and requires the most support.

Vertebrae are the bones of the spine that provide a framework and protection for the spinal nerves. *Discs* are the pads of cartilage between vertebrae and act primarily as cushions for the vertebrae. *Ligaments* act like very strong rubber bands, connecting and stabilizing the vertebrae. The muscles of the back and abdomen help maintain the natural curves of the spine.

Slouching greatly alters the natural alignment of the spine. With postural muscles no longer doing their work, ligaments take up the load, becoming overstretched. This leads to stiffness, fatigue and backache.

Even more serious is the compression of discs resulting from poor sitting posture. When the spine curves forward, pressure within the discs soars. Years of poor posture often lead to a

gradual deterioration of the lower cervical (neck) discs and of the lower lumbar (lower back) discs.

A common result of cervical disc degeneration is a mixture of pain, numbness and tingling in the neck, shoulder, arms and hands, due to compression of the network of nerves (brachial plexus) leading from the neck



The "Nada-Chair Back Sling" cradles the lowerback in a "sling" that is anchored at the knees by padded loops of webbing.

and upper back into the arms and hands. Common symptoms of lumbar disc degeneration are lower back pain, muscle spasms and sciatica (leg pain due to compressed and inflamed nerve roots). Again, the injured disc compresses delicate nerve structures to produce the symptoms.

Spinal degeneration due to poor sitting posture is entirely preventable. There are four simple things you can do to save your back and neck from the rigors of computing: *maintaining good sitting posture, shifting position frequently, moving safely in your chair and performing simple back exercises.*

Rx for a Healthy Spine

Support your lumbar: It can be helpful to use a cushion to support the lower back — a towel rolled to about 6 inches in width or a premade support can fit the bill. Alternately, a seat wedge that tips the pelvis forward can help to restore the lumbar curve; you may either sit on a folded towel a few inches thick or use a premade seat wedge.

Sit close to your work: Keep your chair close to the desk so that you won't strain to reach your work materials. Also, a detachable keyboard can go a long way towards alleviating back strain while computing. When the keyboard is movable, you can select the ideal position for typing. Check the ads in THE RAINBOW — keyboard extender cables are available.

"Prop" your materials: Try propping the work materials up vertically to prevent slumping over the desk. Professional typists often use "copy stands" to hold their papers upright. You might find one at an office supply store.

Use special support helpers: I use two special devices to help maintain good posture for the long haul: a special kneeling chair and a "back sling." The chair is available from office furniture stores. The seat tips your pelvis forward with the legs placed below and the knees are given padded support. The configuration appears rather unusual, but it is really quite comfortable.

The other support device, called the "Nada-Chair Back-Sling" cradles the lower back in a "sling" that is anchored at the knees by padded loops of webbing. The Mayo Clinic has used the Nada-Chair to train their back patients in good sitting posture. A nice feature of the Nada-Chair is its total portability. It can be taken camping, even canoeing.

Shift position frequently: You can diminish the strain and fatigue of sitting by finding a few alternate sitting posi-

tions and switching among them during the day.

Move safely in your chair: Staying active in your chair can help prevent fatigue. Sudden motion should be avoided, however. When turning the body, avoid sudden twisting motions; instead, turn the body as a unit. When bending to pick up something from the floor, support your upper body with one hand on the desk and one foot in front of you.

Simple Back Exercises

Head Press: Place the palms of your hands on your forehead and press firmly for several seconds, then release. Repeat five to 10 times. Likewise, press the back and sides of the head.

Neck Roll: Gently and slowly roll the neck in circles, pausing at places where you feel tension. Breathe deeply to help release the tension. Roll to the left and right alternately. Go slowly! Repeat five to 10 times.

Shoulder Shrug: Bring the shoulders to the ears and press tightly. Release gradually. Next, press shoulders down firmly. Release. Work the shoulders forward and backward in a circular motion. Repeat five to 10 times.

Mid-back Press: With your arms at your side, clasp your hands behind you. Push backward while inhaling deeply to expand the chest. You should feel as if you are pressing your shoulder blades together behind you. Repeat five to 10 times.

Mid-back Stretch: Press one arm above your head, one arm down behind your back. Keep both elbows bent. Try to touch your ear with the upper arm. Stretch and then release. Repeat five to 10 times.

Lower Back Stretch: Stand upright. Place the palms of your hands on your lower back for support. Gently and slowly bend backward. Stretch for a moment and then release. Repeat five to 10 times.

Abdominal Strengtheners: Sit straight with your posterior firmly against the back of the chair. Exhale and tighten your abdominal muscles for a count of 10. Release and repeat five to 10 times.

Years of personal experience have shown that it is far easier to prevent back problems than it is to treat them once an injury has occurred. Take the time to develop good habits of spinal hygiene.

The Nervous System

Computing is, of course, a thought-intensive activity. And, while complet-

ing a successful computing project is rewarding and satisfying, the process of programming and debugging can be extremely stressful and frustrating.

There is a growing body of knowledge indicating the harmful effects of too much stress. Just recently I heard about some research concerning the immune system. It was determined that high levels of stress produce a hormone called A.C.T.H. (Adrenocorticotrophic Hormone, also known as Corticotropin). This hormone, in turn, depresses the functioning of the immune system. In other words, too much stress can get you an infection for your trouble. I can believe it. I used to catch the "flu" with great regularity around final exam time in college. (It helps to do your studying in advance rather than try to cram the night before the exam.) I survived the "flu bugs" during eight years of college — now I have to watch out for "Compu-Crud"!

I have found it useful to take occasional breaks to practice what some researchers call the "Relaxation Response." A simple method of focusing the attention can result in reduced stress and enhanced function. To use the "response," sit in an upright posture with the eyes closed and turned gently upward. But do not force them upward. Select a word of your choice to act as a point of focus. It could be the word "One," or the word "Relax," or any other word of your choice. Imagine the sound of that word being spoken, just as you would imagine the sound of a symphony being played. This is a bit more subtle than just mentally repeating the word.

As you sit, the body becomes more relaxed, the thoughts more subtle. This process is not an attempt at fantasy, escape or self-hypnosis — there should be no attempt to "blank" the mind. By listening to the inner sound you have selected, you offer the mind a simple point of focus. Random thoughts will continue for a time, but become less intrusive. If the mind wanders, gently return to your point of focus.

If you sit like this for several minutes, your brainwaves will become smooth and regular. If an EEG were connected to you, it would indicate brainwaves of 8 to 13 cycles per second, a state called the *Alpha Rhythm*, associated with relaxed awareness.

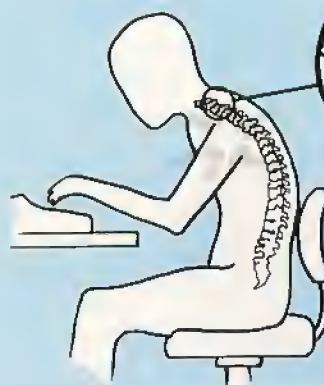
Allow this restful state to continue for 15 to 20 minutes. There is no need to time the session — your body clock will let you know when enough time has elapsed.



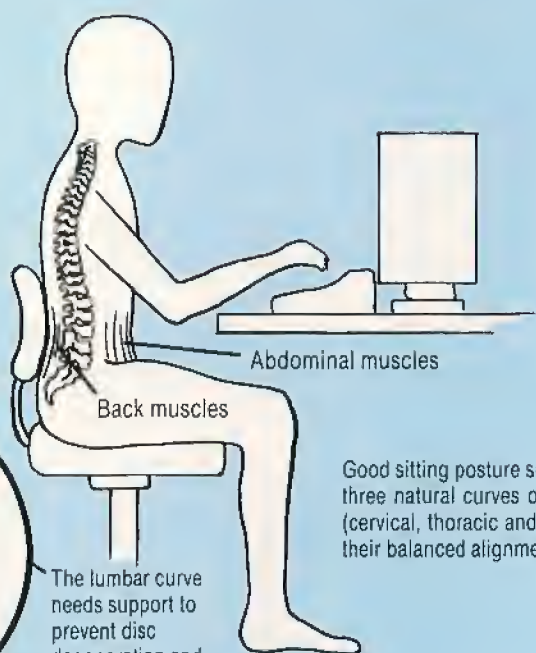
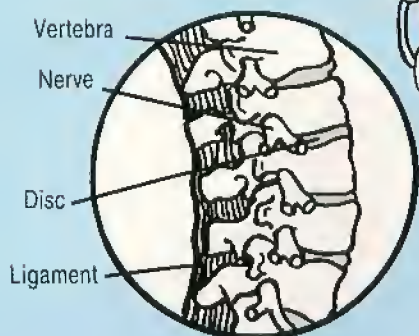
Slouching changes the alignment of the spine, causing ligaments to become stretched, leading to stiffness, fatigue and backache.



Compression of cervical nerves can cause pain and numbness in the neck, shoulder, arms and hands.



Cervical Curve
Thoracic Curve
Lumbar Curve



Good sitting posture supports the three natural curves of the spine (cervical, thoracic and lumbar) in their balanced alignment.

A *biofeedback* instrument can be useful in early training for achieving the Relaxation Response. Radio Shack sells a simple device for measuring the *Galvanic Skin Response*, which operates on the relationship of the electrical resistance of the skin to the amount of stress in the system. The Radio Shack Biofeedback Monitor (Cat. No. 63-675) takes readings of skin resistance and converts them into a variable pitch tone. The more relaxed you become, the lower the pitch of the tone. (The same principles are used in a polygraph or "lie detector" test.)

Reams of information have been written on relaxation. It is certainly not new, and the benefits are many. People who practice in this way on a regular basis are found to have much lower levels of stress in their bodies. Their ability to concentrate is improved. Even high blood pressure can be reduced through relaxation techniques.

Over the years I have come to think of the computer as an extension of me, a sort of "mind amplifier." With the advent of room temperature superconductors, it is quite possible that our

future will bring computers so small, yet so capable, that they can be worn as jewelry and controlled by voice or even by brainwave interpretation. Until that time arrives, we must put up with an imperfect human-to-computer interface. Also, like any mechanical device, our bodies, too, must be carefully maintained.

(Questions or comments regarding this article may be directed to the author at 6540 Outer Loop, Louisville, KY 40228. Please enclose an SASE when requesting a reply.)



A machine language subroutine to help you program the Interface

With the advent of Tandy's Hi-Res Joystick Interface, CoCo 3 owners now have the means to access all of the 640 by 192 pixels that comprise a Hi-Res graphics screen, and at a cost of only \$9.95.

For this price, however, no software is provided — not even a hint on how to program it. My solution to the problem is a simple machine language subroutine, shown in Listing 1.

The interface accomplishes with hardware what is otherwise done with software. The joystick input is compared against a rising ramp. When the ramp voltage reaches the input voltage, the output goes high. The ramp is started by making the cassette output low.

The ramp is a smooth, continuous sawtooth rather than the staircase normally generated by the digital-to-analog converter in the CoCo, which permits a resolution more than 10 times greater than the 64 steps possible with the DAC.

Use of the subroutine is illustrated by the BASIC program in Listing 2. This program draws circles but can easily be enhanced to draw any figures. The ML program is poked into memory, then a Hi-Res screen appears with cross hairs pointing to the pixel selected by the right joystick or mouse. Select the center of the circle and press the firebutton. As long as the button is held, a spot appears at the selected location. Release the button and select any point on the circumference. Press the button again and the circle will be drawn.

(Questions or comments about this program may be directed to the author at P.O. Box 255, Mt. Gretna, PA 17064. Please enclose an SASE when writing for a reply.) □

Duane M. Perkins retired as director of management information systems at the Panama Canal and lives in Mt. Gretna, Pennsylvania. He has had a number of articles published in Modern Electronics and operates an OS-9 BBS at 717-964-3161.

Programming for the Hi-Res Joystick Interface

By Duane M. Perkins

Listing 1

7F00			00100	ORG	\$7F00
7F00	B7	FFD9	00110 ENTER	STA	\$FFD9
7F03	BD	B3ED	00120	JSR	\$B3ED
7F06	4F		00130	CLRA	
7F07	5D		00140	TSTB	
7F08	27	02	00150	BEQ	SKIP1
7F0A	86	08	00160	LDA	#8
7F0C	B7	7F74	00170 SKIP1	STA	PARAM
7F0F	B6	FF01	00180	LDA	\$FF01
7F12	84	F7	00190	ANDA	#\$F7
7F14	BA	7F74	00200	ORA	PARAM

7F17 B7	FF01	00210		STA	\$FF01
7F1A B6	FF03	00220		LDA	\$FF03
7F1D 84	F7	00230		ANDA	#\$F7
7F1F B7	FF03	00240		STA	\$FF03
7F22 8D	2E	00250	LOOP1	BSR	SUBR
7F24 BF	7F75	00260		STX	SAVE
7F27 8D	29	00270		BSR	SUBR
7F29 BC	7F75	00280		CMPX	SAVE
7F2C 26	F4	00290		BNE	LOOP1
7F2E 1F	10	00300		TFR	X,D
7F30 83	0001	00310		SUBD	#1
7F33 7D	7F74	00320		TST	PARAM
7F36 27	0D	00330		BEQ	SKIP2
7F38 44		00340		LSRA	
7F39 56		00350		RORB	
7F3A 1083	00BF	00360		CMPD	#191
7F3E 2F	0E	00370		BLE	SKIP3
7F40 CC	00BF	00380		LDD	#191
7F43 20	09	00390		BRA	SKIP3
7F45 1083	027F	00400	SKIP2	CMPD	#639
7F49 2F	03	00410		BLE	SKIP3
7F4B CC	027F	00420		LDD	#639
7F4E BD	B4F4	00430	SKIP3	JSR	\$B4F4
7F51 39		00440		RTS	
7F52 B6	FF20	00460	SUBR	LDA	\$FF20
7F55 84	03	00462		ANDA	#3

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7F57	8A	FC	00464	ORA	#252
7F59	B7	FF20	00466	STA	\$FF20
7F5C	5F		00468	CLRB	
7F5D	5A		00470	LOOP2	
7F5E	26	FD	00472	BNE	LOOP2
7F60	8E	0094	00474	LDX	#148
7F63	84	23	00480	ANDA	#\$23
7F65	B7	FF20	00490	STA	\$FF20
7F68	30	1F	00500	LOOP3	
7F6A	26	FC	00510	BNE	LOOP3
7F6C	30	01	00520	LOOP4	
7F6E	B6	FF00	00530	LDA	\$FF00
7F71	2A	F9	00540	BPL	LOOP4
7F73	39		00580	RTS	
7F74			00590	PARAM	1
7F75			00600	SAVE	2
		7F00	00610	END	ENTER

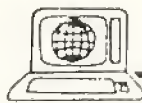
00000 TOTAL ERRORS

Listing 2: HIRESJOY

```

10 'MAKE CIRCLES USING MOUSE OR
20 'JOYSTICK AND TANDY HI-RES
30 'INTERFACE ON COCO3. MACHINE
40 'LANGUAGE SUBROUTINE RESOLVES
50 '640X192 PIXELS.
60 CLEAR 200,&H7EFF
70 FOR A=&H7F00 TO &H7F73
80 READ H$:POKE A,VAL("&H"+H$)
90 NEXT A
100 DEF USR0=&H7F00
110 PALETTE 0,63:PALETTE 1,0
120 HBUFF 1,189
130 HSCREEN 4
140 HGET(0,0)-(21,17),1
150 GOSUB 360
160 IF(PEEK(&HFF00)AND1)>0 THEN
150
170 PX=X:PY=Y
180 HPUT(LX,LY)-(X+10,Y+4),1
190 C=HPOINT(PX,PY)
200 HSET(PX,PY)
210 HGET(LX,LY)-(X+10,Y+4),1
220 IF(PEEK(&HFF00)AND1)=0 THEN
220
230 GOSUB 360
240 IF(PEEK(&HFF00)AND1)>0 THEN
230
250 HPUT(LX,LY)-(X+10,Y+4),1
260 AX=ABS(X-PX):AY=2*ABS(Y-PY)
270 R=SQR(AX*AX+AY*AY)
280 R=INT(R+.5)
290 HCIRCLE(PX,PY),R
300 IF C=0 THEN HRESET(PX,PY)
310 LX=X-10:IF LX<0 THEN LX=0
320 LY=Y-4:IF LY<0 THEN LY=0
330 HGET(LX,LY)-(X+10,Y+4),1
340 IF(PEEK(&HFF00)AND1)=0 THEN
340
350 GOTO 150
360 H=X:V=Y:X=USR0(0):Y=USR0(1)
370 LH=H-10:IF LH<0 THEN LH=0
380 LV=V-4:IF LV<0 THEN LV=0
390 LX=X-10:IF LX<0 THEN LX=0
400 LY=Y-4:IF LY<0 THEN LY=0
410 HPUT(LH,LV)-(H+10,V+4),1
420 HGET(LX,LY)-(X+10,Y+4),1
430 HLINE(LX,Y)-(X+10,Y),PSET
440 HLINE(X,LY)-(X,Y+4),PSET
450 HRESET(X,Y)
460 RETURN
470 DATA B7,FF,D9,BD,B3,ED,4F,5D
,27,02,86,08,B7,7F,74,B6,FF,01,8
4,F7,BA,7F,74,B7,FF,01,B6,FF,03,
84,F7,B7,FF,03,8D,2E,BF,7F,75,8D
,29,BC,7F,75,26,F4,1F,10,83,00,0
1,7D,7F,74,27,0D,44,56,10,83,00,
BF,2F,0E,CC,00,BF,20,09,10,83,02
,7F,2F,03,CC,02,7F,BD,B4
480 DATA F4,39,B6,FF,20,84,03,8A
,FC,B7,FF,20,5F,5A,26,FD,8E,00,9
4,84,23,B7,FF,20,30,1F,26,FC,30,
01,B6,FF,00,2A,F9,39

```

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Reversing a PMODE 4 graphic

A Picture Is Worth 6,144 Bytes

By Dennis H. Weide

Last week a friend called and invited me over to watch her transfer a CoCo graphics printout from paper to a T-shirt by ironing it on.

She had bought a special printer ribbon for heat transfers from Diversions, Inc., 1550 Winding Way, Belmont, CA 94002. The ribbon is guaranteed for at least 20 transfers. Ours came out quite well on the second try, and has been washed twice without any apparent fading.

A Backwards Picture

The only problem we had was that the image on paper had to be reversed from the image on the screen in order to print correctly on the T-shirt. Otherwise, all printing would have been backwards.

What seemed easy at first turned out to be more complicated as we attempted to reverse the screen image for printing. Fortunately, I still have my old CoCo manuals, which explain how graphics modes work in the computer. So, with the help of the manuals and Bill Barden's book, *Color Computer Graphics*, we went to work.

Dennis Weide is a communications technician for AT&T communications in Albuquerque, New Mexico, where he programs AT&T and IBM PCs. He enjoys making toys and teaching computer programming.

Understanding Graphics

The picture we wanted to transfer was saved on disk from a PMODE 4 graphics screen, so we set out to write a program that would reverse a PMODE 4 graphics image.

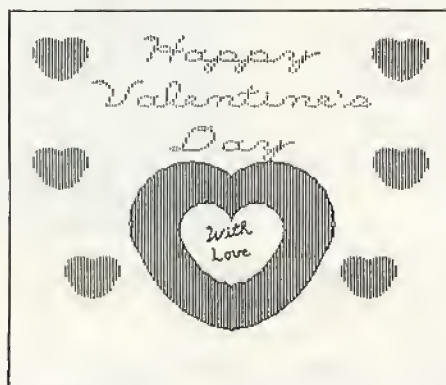
In this mode, there are 192 rows of picture elements, called pixels, which are numbered from 0 through 191. Each row contains 256 pixels numbered from 0 through 255. Each pixel is represented by one bit of one byte of video RAM (graphics memory). Each row of graphics on the screen is made up of 32 bytes of video RAM (256 bits/8 bits per byte = 32 bytes). Since there are 192 rows displayed on the screen and each row consists of 32 bytes, a full screen of

PMODE 4 graphics requires 6,144 bytes of video RAM (32 bytes X 192 rows = 6144 bytes).

To reverse the video image (but not the colors) on the screen, it is necessary to reverse the bit pattern of each byte as well as the bytes themselves. To help you better understand, look at Figure 1.

Note in Figure 1 that the bit images and byte addresses are actually turned end over end. While this may seem a little complicated at first, once you view the graphics page as a binary picture, you can readily see how to reverse it.

The program *Listing 1* is a short BASIC program that lets you see the bits as they are set and reset. To use the program, key it in and run it. The



The screen dump shown on the left is of a normal graphics image. The reversed image is shown on the right. While color is not indicated here, the program switches red and blue artifact colors as the image is reversed. This should not affect black-and-white printing.

graphics screen for PMODE 4 will be displayed.

Type in any number between 0 and 255 (you won't see the text screen until you press the reset button) and watch the bits as they are set on the screen. You can actually see the binary image for each number. The small line you see on the screen is for reference. That byte, Address 4010, has been loaded with 255 to set all 8 of its bits. The address you will be loading, 4042, is directly below that one.

Reversing the Image

To help us reverse the image, we'll use BASIC's powerful AND statement. AND allows you to determine which bits in a byte are set and which are reset. The AND statement takes two binary values and produces a result whose binary value represents only those bits that are set in the first and second binary number.

Look at Figure 2. Notice that only the leftmost bit of the results is set (equal to 1), because this is the only bit set in both A and B.

To see how the BASIC AND statement works, run the program in Listing 2. Enter a number from 0 to 255 to see which bits are set and which are reset. In each pass through the loop, a logical AND is performed on the value of A and the bit position determined by the

BYTE #	#1	#2	.....	#31	#32
NORMAL IMAGE	11000000	11111111	.....	10011100	00000000
REVERSE IMAGE	00000000	00111001	.....	11111111	00000011

NOTE: The above binary values are arbitrary figures chosen at random for this example. The actual values will depend on the graphics image displayed.

Figure 1

DECIMAL	192	=	BINARY	11000000	BINARY VALUE A
DECIMAL	129	=	BINARY	10000001	BINARY VALUE B
DECIMAL	128	=	BINARY	10000000	RESULT OF LOGICAL AND

Figure 2

formula 2^C . The results are then printed on the screen. This short program is the foundation for reversing bit images on the graphics screen.

The complete BASIC program for reversing the graphics image is shown in Listing 3. In order to accomplish the task, each of the 32 bytes in Line 1 of the screen is read, its bit image reversed and the results stored in an array. When all 32 bytes have been read and stored, the array is read backwards and placed back in the row. This procedure continues until all of the 192 rows displayed on the screen have been reversed.

The BASIC program takes about 31 minutes to reverse a PMODE 4 picture, which is quite a long time. So, I wrote a PASCAL version (Listing 4) to accom-

plish the same task in about one minute.

After you've loaded your picture file, run the BASIC version (by entering RUN) or the PASCAL version (by entering EXEC) to reverse the image. When the image has been reversed, load your screen print program and install the special printer ribbon. Once printed, your picture is ready for heat transfer.

The next time you have a family gathering, you can pass out T-shirts decorated with your family crest. Or, your club can design their own logos for hats and shirts.

(Questions or comments may be directed to the author at 14201 Marquette N.E., Albuquerque, NM 87123. Please enclose an SASE when writing for a reply.) □

Editor's note: The PASCAL source presented here will work on a CoCo 3 if it is entered and compiled on a CoCo 3. You could use the version of Deft PASCAL for this. However, the binary file which will appear on RAINBOW ON TAPE and RAINBOW ON DISK this month was compiled on a CoCo 2 and will not run on a CoCo 3.

Listing 1: REVERSE1

```

1000 '          LISTING 1
2000 '
3000 '
4000 CLS
5000 PCLEAR 4
6000 PMODE 4,1:SCREEN 1,1:PCLS
7000 POKE 359,57
8000 POKE 4010,255
9000 INPUT A
10000 POKE 4042,A
11000 GOTO 9000

```

Listing 2: REVERSE2

```

1000 '          LISTING 2
2000 '
3000 '
4000 CLS
5000 INPUT A
6000 FOR C=0 TO 7
7000 IF A AND 2^C THEN PRINT "BIT
" C" IS SET TO 1" ELSE PRINT "BIT
" C" IS SET TO 0"
8000 NEXT C
9000 GOTO 5000

```

Listing 3: REVERSE3

```

1000 '          LISTING 3
2000 '
3000 '          BACKWARDS GRAPHICS
4000 '          BY DENNIS H. WEIDE
5000 '          (C) 1987
6000 '
7000 '
8000 PMODE4,1:SCREEN1,1
9000 FOR X=1 TO 1000:NEXT X
10000 DIMA(31)
11000 FOR X=3584 TO 9727 STEP 32
12000 FOR T=0 TO 31:A(T)=0:NEXT T
13000 FOR Y=0 TO 31
14000 W=1:Z=7
15000 Q=Q+1
16000 C=PEEK(X+Y) AND W
17000 IF C=W THEN A(Y)=A(Y)+2^Z

```

```

1800 W=W*2:Z=Z-1
1900 IF W<256 THEN 1600
2000 NEXT Y:Z=31
2100 FOR Y=0 TO 31

```

```

2200 POKE X+Y,A(Z)
2300 Z=Z-1
2400 NEXT Y,X
2500 FOR X=1 TO 1000:NEXT X

```

Listing 4: REVERSE4

```

(**      LISTING 4      **)
(**      **      **)
(** BACKWARDS GRAPHICS **)
(** BY DENNIS H. WEIDE **)
(**      (C) 1987      **)

PROGRAM BACKWARD;

VAR A : ARRAY [0..31] OF INTEGER;
    ADDRESS,B,C,W,X,Y,Z : INTEGER;

BEGIN
  PAGE;
  BYTE[65479]:=0;
  BYTE[65481]:=0;
  BYTE[65483]:=0;
  BYTE[65484]:=0;
  BYTE[65486]:=0;
  BYTE[65488]:=0;
  BYTE[65490]:=0;
  C:=BYTE[65314];
  BYTE[65314]=(C AND 7)+250;
  BYTE[65477]:=1;

```

```

BYTE[65475]:=1;
BYTE[65472]:=0;
ADDRESS:=3584;
REPEAT
  FOR X:=0 TO 31 DO A[X]:=0;
  FOR Y:=0 TO 31 DO BEGIN
    W:=1;
    Z:=128;
    WHILE W<256 DO BEGIN
      C:=BYTE[ADDRESS+Y] AND W;
      IF C=W THEN A[Y]:=A[Y]+Z;
      W:=W*2;
      Z:=Z DIV 2;
    END;
  END;
  Z:=31;
  FOR Y:=0 TO 31 DO BEGIN
    BYTE[ADDRESS+Y]:=A[Z];
    Z:=PRED(Z);
  END;
  ADDRESS:=ADDRESS+32;
  UNTIL ADDRESS=9728;
  WHILE Z<1000 DO Z:=Z+1;
END.

```

**"I cannot imagine the CoCo 3 without ADOS-3;
it would not be a complete machine."**

The RAINBOW, July 1987

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost \$15.20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

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Software

CoCo 1, 2 & 3

Kung-Fu Dude — Combat Evil With Karate Action

I hate to mention this fact, but we in the CoCo Community have been living with a serious software void for the past several years. Every other type of computer has had this particular type of software, but we, the CoCo users of America, have had to hide our faces in shame because of this great deficiency. But no longer!

What we have been missing is a great Kung Fu-type arcade game. But Glen Dahlgren of Sundog Systems has come to every CoCo owner's rescue. He has given us *Kung-Fu Dude*. We now have our own great karate arcade game.

With a 64K CoCo, one disk drive and a joystick, you learn that you were born to the royal house of Kilachi and that as a child you were foreordained to destroy the dark temple of evil that ruled the land of your birth. To carry out this life mission, your parents sent you far away to the Orient to learn the ancient mysteries of Kung Fu. Later, you learned that the evil rulers of the dark temple had your parents killed because they refused to reveal your location.

After 19 years of study, you learn that the dark temple has kidnapped your

prearranged mate, Princess Trinsim. You decide that now the time has come to seek the destruction of the dreaded dark temple. When you return to your land of birth, you discover that the temple has been moved to a secret location in New York!

Boarding a flight to New York, you soon arrive and begin your search for the evil rulers of the dark temple. Your starting point is the dock area of New York. Almost as soon as you begin your search, you are besieged by hordes of evil henchmen from the dreaded temple. You must call on every skill you have learned of the ancient art of Kung Fu. It is at the New York dock area that the hunt begins.

I had only two problems with *Kung-Fu Dude*. The first stems from the fact that my 9-year-old son, the "Hi-Tech Kid," got the game and the CoCo before I did. After several hours of threats, promises and bribery, I was finally able

to regain control of my CoCo (bear in mind that he does have a CoCo of his own, but for some reason would prefer to pound away at Dad's). The net effect of this problem was that he had run up the high scores and it took me days to even make the high score list, let alone beat him. I'm not saying the game is easy by any means, just that he is tough.

The second problem I had with the program (one I have with all programs) was that it is copy-protected. I realize there are many who feel this is a necessary evil in order to prevent software piracy. However, I feel that it does work a decided disadvantage to the legitimate user, as there is no provision for making a working backup copy. I have been using personal computers for over 10 years now and I have seen more than my share of crashed disks, so the first thing I always do, after making sure a program works, is to make a working backup copy for everyday use and store the original away for safekeeping. You cannot do this with *Kung-Fu Dude*.

In all fairness, I must state that Sundog Systems does offer a limited one-year warranty on the program, guaranteeing that the disk will load or they will replace it free. This is certainly much fairer than those companies offering only a 30-, 60- or 90-day warranty.

Kung-Fu Dude is well-written in 100 percent machine language and is a challenge. After several weeks of use, I still haven't made it to the dark temple.

The graphics in the program are done in artifacted colors. And while the program does run on a CoCo 3, you must use a color composite monitor or color TV set. (On an RGB monitor, all you get are black and white stripes.) The program takes advantage of the high speed mode of the CoCo 3. In fact, once the program boots up, you are asked if you want to play in the CoCo 3 high speed mode. Don't try this with a CoCo 1 or 2 or, as the *Kung-Fu Dude* author puts it, "The video will attempt to fry itself."

If you are playing on a CoCo 3, I suggest you follow the author's further recommendation of playing the game at the slower speed the first few times to get the feel of the game. The high speed mode makes this mode look like slow motion. And you are going to need every advantage you can get to survive in *Kung-Fu Dude*.

You control the Dude with your joystick. There is a set of moves that occurs with the firebutton on, and another set of moves that occurs with the firebutton off. Sometimes it is hard

to keep track of which is which. To assist you in helping to remember which move goes with which direction and firebutton position in *Kung-Fu Dude* and other games like it that use complicated joystick movement, I would like to pass on a little tip that has helped out quite a bit in the Armstrong household.

We use a small 3-by-3-inch square notepad of paper that you can tear off and stick to any surface, and draw a small circle on it to represent the control radius of the joystick. Then we mark the positions of the joystick as they relate to the various movements in the game, noting what movement each joystick position causes. In the case of *Kung-Fu Dude*, we made two such diagrams — one for firebutton-on movements and one for firebutton-off movements. Because these stick-on notes can be removed and replaced many times, we store them with the instructions to the particular game. Then when we decide

to play that particular game, we simply take them out and stick them near the face of the computer screen for quick reference. It is a real help.

Notwithstanding the fact that the program is copy-protected and the Hi-Tech Kid makes it tough for his old Dad to catch up with him, I highly recommend *Kung-Fu Dude*. It is not a game that you will master easily, so it is one that you'll be playing for a long time to come. And if complexity and challenge are a criteria of worth, you'll certainly get your money's worth on this one.

Now the CoCo karate game gap has been filled, and *Kung-Fu Dude* does it excellently. CoCo users of America, hold your heads up high!

(Sundog Systems, 21 Edinburg Drive, Pittsburgh, PA 15235, 412-372-5674; \$24.95: First product review for this company appearing in THE RAINBOW.)

— Kerry Armstrong

Software

CoCo 1, 2 & 3

Disklock — Put a Padlock on Your Data

Having just read a novel about a criminal who kept a journal of his misdeeds on a disk (alas, not a CoCo) and was caught because of it, I looked forward to reviewing *Disklock* by Brian Rodia. Computer security has become a very important issue in the last few years, and even though the criminal aspect is not what RAINBOW readers are interested in, most computer users have some files they would like to keep private.

Disklock and its manual come on an unprotected disk. That means you must have a printer and a word processor to print out the instructions. The manual was written with *VIP Writer* but doesn't cause any problems, even with *Scriptit*. If you don't have a printer but have ADOS, the manual can be read on the screen using the SCAN command.

The purpose of the program is to deny anyone but yourself information from your disk files. It does this very well. The author states he has had *Disklock* tested for some time and no one has been able to break the protection. I made a nominal effort to disable

it using a disk zapper and wasn't successful, even though it was obvious the program writes code to the first two sectors of Track 17.

The program is very simple to operate. Put the disk in Drive 0, type LOADM DISKLOCK and at the OK prompt type EXEC. Then remove *Disklock* and place any disk in Drive 0 and press ENTER. You are given the status of the disk, locked or unlocked, and prompted for a password. When you are returned to the title screen, pressing BREAK returns you to BASIC.

When you type in a password to unlock a disk, the characters are masked on the screen so as not to make it apparent to kibitzers. If you lock a disk and then issue a DIR command from BASIC, all you get is LOCKED! If you try to unlock a disk without the password, you get three tries and, if unsuccessful, are thrown back to BASIC. A password can be up to 14 characters long, allowing the user a lot of latitude for exotic combinations.

As it is, I think *Disklock* is a valuable utility if you need the security it provides. Brian Rodia is issuing it as a shareware program, so payment is whatever you feel it's worth. It is advertised to work on all three Color Computers. I tested it on both the CoCo 2 and 3 and the performance was identical.

The only criticism that could be made is that there are no screen prompts and no provision is made for multiple drive

operation. Considering the simplicity and price of this program, that may be the ultimate in nitpicking. The last caveat, which the author stresses, is don't accidentally lock your *Disklock* disk unless you have a backup!

(Brian J. Rodia, 6593 Redcoach Ln., Reynoldsburg, OH 43065, 614-868-0216; Shareware: First product review for this company appearing in THE RAINBOW.)

— Frank Mardon

Software

CoCo 1, 2 & 3 OS-9

Robot Odyssey — Adventures in Robotropolis

You have fallen into Robotropolis, an underground city populated by robots. Your mission is to escape back to civilization, with a little help from the robots. *Robot Odyssey* combines a five-level Adventure game with a set of problem-solving tutorials designed to help you complete the journey. This is not your typical Adventure game. Plan on spending weeks (if not months) completing this one. Fortunately, games can and should be saved as you go along.

Section One involves a robot anatomy course, which takes about 20 to 30 minutes to complete. The player gets a detailed look at how robots behave and what equipment they have. This knowledge helps get you through Level 1. Before moving on to the next level, it's necessary to learn about wiring and robot circuits. In the higher levels of the game, learning chip design and doing some experimentation is essential for success.

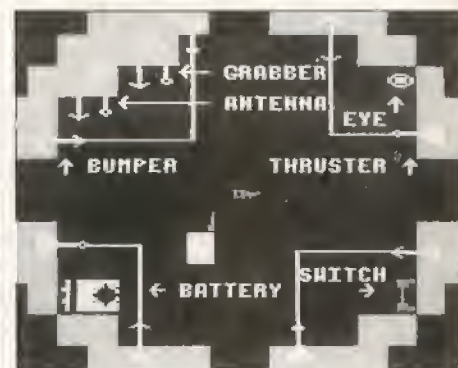
The Learning Company has gained a reputation for developing excellent educational software, and this program is no exception. Contained within the program is a mini-course in electronic engineering, design and problem-solving skills. In a way, it's a logical sequel to *Rocky's Boots*, an earlier program they developed. If you aren't acquainted with *Rocky's Boots*, I'd suggest that you start with it first. Not only will the experience be fun and educational, it will help you with *Robot Odyssey*.

This program is a natural for teachers who want to teach problem-solving or the Scientific Method. The Learning Company has additional classroom materials available to accompany the program. Vocational, electronics and electrical engineering instructors should also look closely at its possibilities. It would make an excellent introductory project.

Recommended age for this Adventure is 13 and up. I agree. The tutorials are deceptively easy, but looking at the program as a whole can be a mind-boggling experience that would be better handled by teens and adults. The tasks become increasingly more complex at the higher levels of the game. To make things more interesting, obstacles such as power-sucking 'Ampire bots and invisible mine fields appear. There are so many variations in *Robot Odyssey* that it can be used over and over again, which is a definite plus for both home and school use.

The graphics are excellent, the educational goals sound, but some aspects of the 70-page manual bugged me. It has directions for the IBM PC and Apple, along with the CoCo. When reading for information, you have to wade through three different sets of commands to figure out how to perform a particular operation. I would gladly pay extra to

have a separate Color Computer version. Also, it is interesting to note that certain "extra" sections, such as a Robotropolis Preview and Robot Teamwork were conspicuously absent from the CoCo version of the program.



Robot Odyssey is designed primarily for the CoCo 1 or 2, and uses artifact colors that don't show up on the CoCo 3 when used with an RGB monitor. CoCo 3 users need a composite monitor or TV to take advantage of the color capabilities. I hope The Learning Company will consider adding an RGB/composite option on start-up like some of the newer OS-9 software that is currently available.

Robot Odyssey deserves an 'A' for both its novel approach and educational value. Although the manual is a bit awkward in some respects, it is obvious that the authors put a lot of care and planning into the program itself. I'm glad that excellent software such as this, once only available for the Apple and PC Compatibles, is now available for the Color Computer.

(The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555, \$49.95. Available in Radio Shack stores nationwide)

— Mark Haverstock

Check Account Information System

Manage your checking account(s) with **CAIS**. Keep track of deposits, checks, ATM withdrawals and other account transactions. Define up to 36 categories to monitor expenses. Set up automatic transactions for such items as direct deposits or pre-authorized deductions. Balance your account(s) in minutes! Other features include multi-drive capability, display and print options, history purge and more.

Requires 1 disk drive
Printer is optional
CoCo 3 compatible



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See review in this month's issue!

Color Max 3 Font Editor — Add Characters to Your Creations

Color Max 3 Font Editor is a useful addition to your *ColorMax 3* package. With this program, you can load various print fonts into your *Color Max 3* creations, then edit them or create custom ones to suit your own tastes.

Color Max 3 Font Editor was written by Eric A. Wolf. It requires a 128K CoCo 3, a disk drive, and a joystick or mouse. The program is loaded in with a simple BASIC loader that calls the main machine language program. The disk is not copy-protected, so backup copies for your own use are not a problem.

After loading the program and answering prompts concerning RGB or composite monitors and type of joystick in use, you are presented with the main operating screen. This screen consists of a grid and a point-and-shoot menu that allows you to examine each character in detail or to modify it.

At the bottom of the menu is a number that ranges from 032 to 127 representing the ASCII value of the character. This number is toggled with the joystick or mouse firebutton to select the character you want to examine or modify. The view font option allows you to see all the characters of a particular font at the same time. The disk contains the following fonts: Crystal, Downhill, Film, Glyphic, Old English and Stripe.

Glyphic is a neat collection of 70 small pictures and symbols that can be added for some nice effects with *Color Max 3* pictures. Downhill has a slanted effect, and Crystal looks like the LCD characters on your wrist watch. The Film font looks like the standard block letters, except they are in negative form and have little sprocket holes at the top and bottom of each character font frame. The others speak for themselves and are equally well done.

The fonts can be edited or new ones created by simply clicking the firebutton at the cursor position pointed to by the movable arrow. The grid is done in typical "fat bit" style, providing the opportunity to easily modify or create special characters and symbols.

A second disk containing 11 other

fonts is available for \$19.95. The fonts contained on this disk include Lined, USA, Cameo, Potted, July 4, Bells, Roadsign, ASCII-SM, Tech-Lg, Banner and Large.

Color Max 3 Font Editor is a good program and is sure to enhance *Color Max 3*. I found it both easy and fun to use.

(Spectrum Projects Inc., P.O. Box 264, Howard Beach, NY 11414, 718-835-1344; \$29.95 plus \$3 S/H)

— Jerry Semones

Software

CoCo 1, 2 & 3

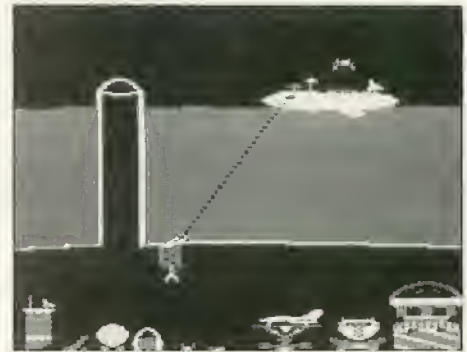
Currillian Cruiser — The World's Last Hope

"The year was 2584. Four hundred seventy-two years after the unification of the Earth-born galaxies. The largest and most terrible war was just beginning to dawn, a war with little warning and relentless fighting. Many people lost their lives, whole planets were shredded without the Earth-men ever having a hint what had or could have done something of this magnitude. This is the tale of the Skirum War and the *Currillian Cruiser*."

You are the sole pilot of the ship and the last hope for Earth. In your journey to complete the defense systems of the *Currillian Cruiser*, you will travel to distant planets and encounter many enemies. While traveling to the planets Elleval, Ita-Falac, Smea, Denrael and Alpha Centuri you fly head-on into a hazardous meteor shower, face merciless unmanned Skirum interceptor attack vehicles, and enter the hulls of military and scientific research vessels to obtain a missing weapon system, a fission laser system, warheads and a guidance system.

Currillian Cruiser is an arcade-type Adventure game that has good game play and a brilliantly written scenario.

The copy-protected disk comes with a four-page manual featuring a detailed drawing of the *Currillian Cruiser* on the front. The second page of the manual contains information on loading, playing (a note to remove the disk during game play since the computer accesses the disk many times) and saving the game. The last two pages give the story of *Currillian Cruiser*.



The game can be used on a Color Computer 1, 2 or 3 and requires a joystick. I recommend a self-centering joystick since you must make fast and difficult maneuvers during most of the game.

Currillian Cruiser has some nice features. The main menu has options to start the game, go to the title screen, see the high scores and quit the game, which requires you to shut off the computer.

After choosing the start game option, you are prompted to type in your name for a new game or to choose a number from one of the maximum nine game saves. The high score screen lists up to 12 scores. In this game, scoring goes by the number of the board you survived through. Between boards, you are prompted with options to continue to the next board, save the game or quit the current game.

The PMODE graphics come out in

One-Liner Contest Winner . . .

Use this program to look at the contents of your disk and check for errors. It's helpful for Adventure disks, too!

The listing:

```
1 CLEAR10000:FORX=0TO34:FORY=1TO
18:DSKI$0,X,Y,A$,B$:PRINTA$;B$;;
IFINKEY$=""THEN NEXTY:PLAY"L255;
1;12":NEXT:ELSE PLAY"P2":NEXTY:P
LAY"1;12":NEXT
```

Brad Lowe
Lafayette, CA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

black-and-white on the Color Computer 3 when using an RGB monitor. The screens are nicely done and give the effect of a futuristic setting.

Altogether, this game is pretty good. It requires a lot of hand-eye coordination and is challenging.

(Glenn Calafati, 54 Oak Street, Northport, NY 11768, 516-261-4105; \$25: First product review for this company appearing in THE RAINBOW.)

— Glen Baisley

Software

CoCo 1, 2 & 3

Master Disk — Catalogs Your Disks

Master Disk is a disk cataloging program that works on any version of the CoCo having at least 32K. The program is written in BASIC and is not copy-protected. *Master Disk* works with a single disk drive and, therefore, may be of interest to beginners.

Master Disk is very colorful and, I might add, somewhat noisy. I mention this only because while the program is well-structured, the continued call to the sound subroutines does slow down overall program execution speed.

Master Disk is menu-driven and very easy to use. A single page of instructions comes with the disk, but the program contains onscreen help. You can create, sort, print and save to disk up to 18 disk directories with up to 250 program names in each directory. This provides a sufficient number of disk categories for most users, and with 250 program names in each category, the program will handle most CoCo user applications.

Master Disk lets you look at all entries by a specific searched-for name, or an entire disk directory. In addition to saving and displaying program names and extensions, the name of the disk containing the program is saved and displayed. This name is assigned by the user and is limited to nine characters.

This offering from Bob's Software is worthy of your consideration. The price won't make a big dent in your wallet and you can put *Master Disk* to practical use organizing your disks.

(Bob's Software, P.O. Box 391, Cleveland, OH 44107, 216-871-8858; \$15 plus \$2 S/H)

— David Gerald

Software

CoCo 1, 2 & 3

CAIS — Check Account Information System

I used to have a pathological hatred of the simple act of balancing my checkbook. It's not that I was afraid of the work, I just didn't like to spend the time doing it. Now the hard part is done for me, thanks to *CAIS*.

CAIS stands for Check Account Information System. And before you let fly that groan of, "Oh no, another checkbook program!" let me tell you that *CAIS* is not run-of-the-mill. It is a fast, simple, accurate and yet very detailed way of handling up to eight different accounts.

CAIS was written for the disk-based CoCo 1, 2 and 3 using RS-DOS 1.1. I used ADOS-3 and had no problems with any functions.

The only command to remember is the one that starts the program (RUN "CAIS.BAS"). After that, there are extensive onscreen prompts, as well as full menus wherever possible. On start-up, all you need to do is enter the current date, and the main menu appears.

The first time you use this program, you will need to define the account information. This is where you enter the name of the bank, account type (regular or interest-bearing), what drive you want the information stored on, and the account number and balance. And for once, here is a program that stores your number exactly as you enter it — regardless of how many digits it contains. This has been a problem with every other checking program I have seen.

You may continue to enter information about other accounts you want to track. I have three checking accounts (one account for my wife, one for me and one for business). As I wanted to use the program as much as possible, I also added my two savings accounts to the batch.

After you have entered this information (along with the account balance — the program tracks each account individually), you may either edit the information or return to the main menu to begin the processing.

When you select an item from the main menu other than the account control (the setup option), you are presented with another menu to help you select which account you want to access. Your other main menu choices are Post Account, Reconcile (balance) Account, Display Account, Print Account, Purge Account History and Exit.

Post Account means just what the name implies. This option allows you to make deposits, debit the account, and otherwise manipulate the figures. And

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for each expense or credit, an option is given to apply the amount to an expense category you previously defined (up to 36 definitions per account). I said before how easy it was to use this program to track savings, as well — all I did was define a category as "Withdrawal" and one as "Deposit." I used the "Payable to" field to explain the transaction.

Flexibility is the key in posting transactions. You may enter codes for deposit, checks (it keeps track of the numbers, unless you override it), ATM withdrawals and any automatic deposits/withdrawals you care to define. The autos use the date you enter both at the beginning of the program and in the definition of the automatic transaction to make the change at the appropriate

time. And it notifies you of that change. This is a real "set and forget" feature.

Reconcile Account provides a detailed balance report with a minimum of work on your part. Pick a starting check number, and the program steps through each transaction with you to see if the statement covers it. If not, the information is added to the stack and the selection process continues.

When presented with the balance, all you need to do is compare it with the bank's statement. If it is not correct, press BREAK and research the problem. If it is correct, you may then print the statement. The cleared transactions are moved to a history file, and you may then print the updated check register or return to the main menu.

Display Account and Print Account are essentially the same. One shows the information onscreen only, and the other prints both to the screen and the printer (the baud rate you want is poked in for you, since you set this option way back at the beginning). At this point, you can literally see any combination of information needed either between two dates, or from all the information on file.

The final option is Purge Account History. Here is where you can delete older information by date. All you do is enter the beginning and ending dates, and all information between those dates is purged. The rest remains intact. If you print a copy of the file before you purge, you can save disk space and still have the information handy.

The manual that comes with the program is very detailed and extremely easy to follow. It is laid out in the same order as the main menu. Each option is explained in depth, and the information necessary to use each option is readily available on that page. The only other thing I would like to have seen is one page devoted to the one-letter codes used throughout the program (D=Deposit, C=Check, etc.). Then I could set this page next to my CoCo and get into high gear.

The nice thing about CAIS is that one version fits all. It doesn't matter whether you have a CoCo I or 3, one disk drive or two, or even whether you have a printer. The program is flexible enough to handle whatever system you have. The manual (70 pages) tells you how to configure to your system, all within the program (no editing required).

Overall, CAIS performs well beyond the advertised limits. I found it both easy to use and flexible enough to handle whatever my financial situation required. The manual is detailed without being dry. And the price is low enough to put it within reach of virtually anyone. In short, if you have a checking or savings account, CAIS should be in your library.

(After Five Software, P.O. Box 210975, Columbia, SC 29221, 803-788-5995; \$34.95 plus \$3 S/H)

Plug-N-Go.

MULTI-FONT PRINTER NX-1000

NEW

(Draft)
ABCDEF abcdef 0123
ABCDEF abcdef 0123

(Course)
ABCDEF abcdef 0123
ABCDEF abcdef 0123

(Sanserif)
ABCDEF abcdef 0123
ABCDEF abcdef 0123

(Printer 1)
ABCDEF ABCDEF 0123
ABCDEF ABCDEF 0123

(Printer 2)
ABCDEF abcdef 0123
ABCDEF abcdef 0123

Draft and various NLQ type styles



The NX-1000 gives you plenty of print options for attractive printing. Four typestyles. Four pitch sizes, in standard and italics for a total of 32 NLQ modes. 1 year warranty. Nationwide depot service from Honeywell. 30 day online trial.



SPECS. 144 cps Draft, 36 cps NLQ, Italics Sub & Superscripts, Emphasized, Doublestrike, Proportional, Condensed, International, Downloadable Char., 4 built in fonts, Graphics 480-1920 dots/line, Forward or Reverse n/216" Line Feeds, Friction and Push Tractor, 4K Data Buffer, Hex Dump.

SYSTEM INCLUDES:

- Star NX-1000 Printer
- Blue Streak 3 Interface (see opposite page)
- Software Support Trio (see below)

\$239⁹⁵
+\$10 Shipping and Insurance
COMPLETE

Software Support Trio

TYPE SELECTION/ TUTORIAL	DRAYON'S WORD PROCESSOR 2.3	SUPER GEMPRINT	COLOUR SUPER GEMPRINT
Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.	Create, save and print customized documents with full access to printer's special features.	Will transfer a Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.	Transfers color screens to Colour NX-1000. 8"x11" hardcopy in any two colors for Pmode 0, 2 or 4 and any 4 colors for Pmodes 1 & 3.
Software Trio \$19⁹⁵	Software Trio w/Colour Super Gemprint \$29⁹⁵		
<small>Price, availability and specifications subject to change without notice.</small>			

DAYTON ASSOCIATES of W.R. HALL, INC.

7201 CLAIRCREST, BLDG. D
DAYTON, OHIO 45424

OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD \$2.00

PERSONAL SERVICE

(513) 236-1454

Visa & MasterCard
within the continental U.S.

Video Cards/Keno — Play the Odds

Video poker machines are found in a lot of places outside of Nevada where gambling on them is legal. In some areas they are regular fixtures in local bars and lounges. For some, they are a kind of adult video game. For others, they are another opportunity to gamble. If you play them or if you have always wanted to, *Video Cards/Keno* from Tom Mix Software may be for you.

Video Cards/Keno is designed for the Color Computer 3 with disk drive. The instructions are simple and the disk loads easily. After a title page the screen presents a menu. Your choices are Poker, Joker's Wild, Blackjack, Keno and Quit. After you make a choice, the screen asks if you are using a composite or RGB monitor. The next screen asks the number of credits you want to start with, and then your game begins with a prompt asking you how much you want to bet. You bet and the cards are dealt. (Or, in Keno, the numbers are chosen.) If you win, your credits are increased. Unless your credits are down to zero, you again return to the bet prompt. You can play as long as you have credits to bet. (If you do run out of credits, you can always get more.)

Poker and joker poker are fun to play. (The difference between the two games, for those unfamiliar with poker machines, is that the deck used in joker poker contains a joker that can be used as a wild card. Because it is easier to draw a winning hand, the payoffs are reduced.) As with the real machines, the deck is stacked against you. Payoffs do not reflect the true odds — the longer you play, the more likely you will lose. Trying to overcome the laws of probability can be enjoyable and maybe even educational.

I found blackjack to be even more fun. (I find that competing against someone, even if it's the computer as dealer, makes a game more interesting.) The game is not much different from the game played in a casino. Thus, learning the right blackjack moves can significantly reduce the computer's advantage. The blackjack game was fast and entertaining.

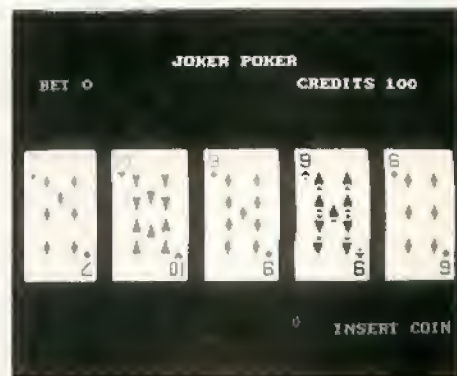
Keno allows you to pick numbers from 1 to 80 and then the computer chooses the winning numbers. Payoffs are based upon how many numbers match. (State lotto-type games work in a similar fashion.) Keno/lotto games have never fascinated me. Predictably, I found this game to be the least interesting of the games.

This package has two strong points to recommend it. The first is its outstanding graphics. Each program makes use of the Color Computer 3's added graphics capabilities. I own other programs that use playing cards in the program. In terms of resolution, *Video Cards/Keno* is the best.

Secondly, I liked the speed of the programs — cards are dealt and results

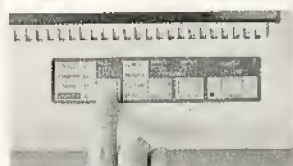
are computed very quickly. Additionally, each game allows for a maximum bet key that saves the time of pressing the C (for coin) key over and over again.

If I could have asked for more from



...For the CoCo!

MULTI-FONT PRINTER NX-1000 RAINBOW



Select print mode, typeface and print pitch all from the front control panel



Single sheet feed possible without removing sprocket paper

star
microelectronics

All the features, performance and dependability of the NX-1000 plus online access to 7 color printing and graphics. Black, blue, red, yellow, green, violet, and orange.

SYSTEM INCLUDES:

- Star NX-1000 Colour Printer
- Blue Streak 3 Freedom Interface (see below)
- Software Trio (see opposite page)
- Colour Super Gemprint

\$329⁹⁵

+ \$10 Shipping and Insurance

COMPLETE

Blue Streak 3 Freedom Interface

Introduce your CoCo to the World's Best Printers

This 3rd generation Blue Streak gives all CoCos transparent access to parallel printers and opens an additional serial port with the flick of a switch. Break loose from the speed constricting serial ports of those custom manufactured printers and run up to 9600 baud. Easily connected, one year warranty, 30 day online trial.

\$49⁹⁵

+ \$2 Shipping

Powered Version add \$5.00

Price, availability and specifications subject to change without notice.

DAYTON ASSOCIATES of W.R. HALL, INC.

7201 CLAIRCREST, BLDG. D
DAYTON, OHIO 45424

OHIO RESIDENTS ADD 6% SALES TAX • C.O.D. ADD \$2.00

PERSONAL SERVICE

(513) 236-1454

Visa & MasterCard
within the continental U.S.

Tom Mix Software, it would have been the ability to make slight changes in either the payoffs or the way the games are played. (I like more of a chance in poker games.) Overall, if you enjoy gambling machines, you will probably enjoy *Video Cards/Keno*.

(Tom Mix Software, P.O. Box 201, Ada, MI 49301, 616-676-8172; \$29.95)

— John Matviko

Software

CoCo 1, 2 & 3

Color Math — Reinforces Math Skills

Color Math is an educational program that lets your child practice the four basic math skills (addition, subtraction, multiplication, division) he or she is learning at school. It requires at least 16K and a cassette recorder.

The option screen allows you to choose one of the two options in that part of the program (each part has either addition and subtraction, or multiplication and division). You then choose the maximum number of programs the child will practice, and then select one of the four options: Placement, Lessons, Tests or Change maximum problems.

The first option allows you to find the most appropriate skill lesson for your child to start his or her lessons. The second option uses skill building to increase math skills and has automatic promotion as each lesson is mastered. The third option tests your child on any lesson in the program to evaluate proficiency at that level. The fourth option allows you to change the number of problems that your child will do.

After you choose the option you want, the child starts working the problems. The addition/subtraction lessons have 70 different mastery levels, the multiplication has 50 mastery levels, and the division has 37 mastery levels.

In the early mastery levels, the child is shown when to carry or borrow numbers, and in the higher levels the child can use the letters 'C' or 'B' to perform these functions. In addition and subtraction, the child has two chances to answer a question correctly.

After the second try, the correct answer appears, and the problem is repeated until it is solved correctly. In multiplication and division, the computer checks each digit as it is typed. The child gets two opportunities to enter each number correctly. If both tries are wrong, the correct digit appears and the cursor moves to the next digit. After each lesson is completed, you see the report screen, which shows if the child is promoted to the next level or demoted to the previous level.

Color Math is a good program. It not only helps the child to improve his/her math skills, but provides the needed reinforcement of those skills. This is also a good program if you want to monitor your child's progress as he or she goes through each lesson.

(Tandy Corporation, 1700 One Tandy Center, Ft. Worth, TX 76102; \$19.95. Available in Radio Shack stores nationwide.)

— John H. Appel

Software

CoCo 3

Backup Lightning — Faster Than A Speeding MS-DOS

Backup Lightning is a handy utility for the 512K equipped Color Computer 3. As the program name implies, this software is used to duplicate disks.

In developing *Backup Lightning*, Color Venture has made full use of the capabilities of the 512K CoCo 3. It will copy 35-, 40- or 80-track disks. The entire disk is copied into memory as a

first step, then duplicates are written as requested. Both RS-DOS and OS-9 format disks are copied with ease. The speed at which the duplication is done is remarkable.

Using *Backup Lightning* is as simple as typing LOADM "BACKUP" and answering a few prompts. The user can then load a previously saved configuration or may choose to input the few pieces of data needed for a new configuration. One- or two-sided drives may be selected. Drive speed may be maximized up to 6 ms and up to four drives (0, 1, 2, 3) are supported.

The display screen keeps the user informed of what the parameters selected are, and what is currently going on. The program name and copyright information appear at the top. Just below that, a configuration screen displays the parameters (number of sides and drive designations for read and write, setup rate, etc.) currently being used. A menu/status area occupies the major portion of the screen, telling the user what actions are taking place. Along the bottom of the screen is a help message area.

I had no difficulty at all in duplicating either RS-DOS or OS-9 disks, with either formatted or non-formatted target disks. As a believer in the precaution of backing up all of my software, I found the program invaluable. Copy-protected software, however, cannot be duplicated with *Backup Lightning*.

If you have a 512K CoCo 3 and want to protect yourself from disk crashes, *Backup Lightning* is a very handy tool and an excellent value.

(Performance Peripherals, 11432 Pena Way, Mira Loma, CA 91752, 714-681-7222; \$19.95)

— Leonard Hyre

Hint . . .

Disk or Cassette I/O Errors?

Make sure the disk drive(s) and cassette recorder are not on the left side of the TV set (or if they are, that they're at least six inches or more away). This is because a TV set's flyback transformer, almost always on the left side of the set, puts out a strong magnetic field which can interfere with cassette or disk operation.

Education Breakthrough

New interactive CoCo software makes learning easy, fun. Kids love it!

NEW LOW PRICE - 16 lessons for the price of 8! Educational Software for kids from 6 to 18.

Parents are depending more and more on supplemental education for their children. Educators know that the most effective teaching is done one-to-one. Through individual attention and self-paced progress, students learn more and retain more.

BETTER THAN A PRIVATE TUTOR

The Compass Education Software LOOK/LISTEN/LEARN approach is the next best thing to a private tutor. Unlike other educational software the Compass Library also *talks* to the student — not in synthesized speech, but in a real human voice. With on-screen textual information and attention-getting graphics, students of all ages actually enjoy learning!

SELF-PACED FOR BETTER RETENTION

The lessons advance only after the student has correctly answered the questions throughout the programs assuring that the material has been thoroughly absorbed.

SIMPLE EQUIPMENT REQUIREMENTS

All you need is the TRS-80* Color Computer (any model), computer cassette recorder and TV set. Once the cassette is loaded you need only enter two simple commands . . . and then press any key to start the lesson.

Of course you can stop the lesson at any point to study information on the screen. Just push the pause button on the cassette player. Push it again and lesson resumes.

To answer questions throughout the lesson simply press the appropriate number on the computer keyboard, type in the correct answer, or follow other easy instructions. And to go back and review, just rewind the cassette. It's that simple.

CHOOSE FROM 9 SUBJECTS

There is not sufficient space in this advertisement to list all lesson titles, but here is a sample:

MATHEMATICS

In today's advanced, HiTech world, understanding and working with numbers is essential. Compass has developed three comprehensive series of math programs. From basic numerals for the very young, to algebra and higher mathematics for the older child. In between, there are programs for everything from addition and subtraction to practical everyday percentage problems.

*TRS-80 is a registered trademark of The Tandy Corporation.

PRICES SLASHED!



1 MATH/FRACTIONS Grades 4 to 8

- MF 1 — Numerator, denominator, bar
- MF 2 — Multiplication of fractions
- MF 3 — Factors and prime numbers
- MF 4 — Reducing fractions, reciprocals
- MF 5 — Reducing fractions, lowest terms
- MF 6 — Proper fractions, mixed numbers
- MF 7 — Multiplication-division of fractions
- MF 8 — Addition-subtraction of fractions
- MF 9 — Addition of mixed numbers
- MF 10 — Changing fractions to decimals
- MF 11 — Converting decimal numbers
- MF 12 — Word problems using percents
- MF 13 — Additional problems using percents
- MF 14 — Word problems using percents
- MF 15 — Finding circle area using pi
- MF 16 — Using a ruler to measure fractions

2 MATH/BASIC ALGEBRA For all grades Sixteen lessons: MBA-1 to 16

3 MATH/NUMBERS For grades 1 to 6 Sixteen lessons: MN-1 to 16

SELF DEVELOPMENT

Writing effectively means communicating effectively. Through the writing series of lesson students of all ages will develop basic skills needed to turn thoughts and ideas into expressive words and phrases.

4 RULES OF WRITING For all grades Sixteen lessons: RW-1 to 16

LANGUAGE ARTS

A practical education begins with good reading skills and is continued with increased vocabulary comprehension and, of course, spelling. Your child will learn that reading is fun while they are also learning when to use "to," "too," and "two," and how to spell when building a vocabulary.



5 THE MAGIC OF SPELLING Grades 4 to 8

- MS 1 — Plurals: branches, rodeos, valleys
- MS 2 — Plurals: houses, brushes, candies
- MS 3 — Plurals: babies, pianos, leaves
- MS 4 — Suffixes: boxed, referred, writing
- MS 5 — Suffixes: paid, quickly, extremely
- MS 6 — Suffixes: said, confusion, school's
- MS 7 — Homonyms: two, too, to; their, there
- MS 8 — Homonyms: our, are, hour; ate, eight
- MS 9 — Homonyms: weight, wait; who's, whose
- MS 10 — Homonyms: scent, cent; sell, cell
- MS 11 — Homonyms: dew, due; course, coarse
- MS 12 — Homonyms: cite, site, sight; by, buy
- MS 13 — Homonyms: blue, blew, creek, creak
- MS 14 — Homonyms: sale, sail; steel, steal
- MS 15 — Spelling by Syllables: letter, color
- MS 16 — Doubling Consonant Letters: hollow

6 VOCABULARY COMPREHENSION Grades 3 to 5 Sixteen lessons: VC-1 to 16

7 READING COMPREHENSION For all grades Sixteen lessons: DRC-1 to 16

8 SCIENCE SCIENCE/PHYSICS For all grades Sixteen lessons: SP-1 to 16

9 HISTORY AMERICAN HISTORY For grades 4 to 12 Sixteen lessons: AH-1 to 16

So there it is . . . no-nonsense subject matter presented in a way that maximizes understanding and retention.

SPECIAL PRICING

YORK 10 is now offering, for a limited time, a complete set in any subject, 16 cassettes, one lesson on each cassette, for only \$49.95. We originally offered only 8 cassettes for the same amount so now it's twice the value. The same 16 cassettes are sold elsewhere for over \$150.

To order, send your check or money order for **\$49.95** (CA residents add sales tax) for each subject you wish, plus **\$3.50** shipping and handling (any quantity). For immediate shipment, call collect the number below and charge your VISA or MASTERCARD.



The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it is what it purports to be.

CCRAM, a software-only implementation of a RAM disk. The program requires OS-9 Level I Version 2, 512K and single disk drive. For the CoCo 3. *Dime-A-Byte, 116 Webster Avenue, Bangor, ME 04401, (207) 942-0739; \$28 plus \$2 S/H.*

Chemistry Tutor, an educational learning aid for high school or college level chemistry principles. Text lessons are combined with high resolution graphics. For the CoCo 1 and 2. *A to Z Unlimited, 901 Ferndale Boulevard, High Point, NC 27260, (919) 882-6255; \$42 plus \$3 S/H.*

CoCo Max III, a graphics drawing system with animation and color sequencing. Includes Hi-Res interface for your mouse or joystick, *CoCo Max III* disk and several utilities. For the CoCo 3. *Colorware, 242-W West Avenue, Darien, CT 06820, (800) 221-0916; \$79.95.*

Grand Prix Challenge, a high-speed racing game that lets you compete against the computer or a friend. Includes detailed 320-by-200 graphics, realistic driving conditions and different race tracks. For the CoCo 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, (416) 878-8358; \$28.95 U.S.; \$38.95 Cdn.*

Lightning RAM Disk, a utility for your 512K CoCo 3 that allows the simultaneous use of up to four mechanical drives and two RAM drives. *Dr. Preble's Programs, 6540 Outer Loop, Louisville, KY 40228, 502-969-1818; \$19.95.*

MPI-CoCo Locking Plate, an accessory that protects your CoCo 3 and multipack interface. Installs on the bottom of both units and prevents bumping of the multipack interface from the ROM slot of

your CoCo. For the CoCo 3. *Gimmesoft, P.O. Box 421, Perry Hall, MD 21128, (301) 256-7558; \$9.95.*

Printer Lightning, a ColorVenture print spooler which gives a 44K print buffer from a 128K CoCo and up to 438K from a 512K CoCo. *Owl-Ware, P.O. Box 116-A, Meritztown, PA 19539, 800-245-6228; in Penn., 215-682-6855; \$19.95.*

The Rat Graphic Design Package, a graphics program that supports 320-by-200 Hi-Res graphics made with a 16-color, user-definable palette. The package is complete with screen print routines, a mouse and mouse pad. For the CoCo 3. *Diecom Products, Inc., 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, (416) 878-8358; \$69.95 U.S.; \$99.95 Cdn.*

Sixdrive, Version 1.0A, a machine language utility that modifies Disk Extended BASIC 1.0 or 1.1, *FKEYS III*, or ADOS to allow the use of three double-sided drives as six single-sided drives. For the CoCo 1, 2 and 3. *Gimmesoft, P.O. Box 421, Perry Hall, MD 21128, (301) 256-7558; \$16.95.*

Super-Graphics 16, a graphics program that lets you create art using every color of the rainbow. Draw and paint lines, boxes, circles, etc., and make a printed copy with a Radio Shack DMP-105 or similar dot matrix printer. For the CoCo 1, 2 and 3. *E.Z. Friendly Software, Hutton and Orchard Streets, Rhinecliff, NY 12574, (914) 876-3935; \$16 plus \$1.50 S/H.*

TX-80, a printer page editor with 5,280 print positions. The program allows global editing and uses a WYSIWYG format. For the CoCo 3. *Kolesar B/S, 7 Ladd Road, Westfield, PA 16950, (814) 367-5384; \$39.95 plus \$2 S/H.*

TEXTFORM, a menu-driven program designed to format ASCII text files into two-column format. Output may be directed to either a printer or disk file. For the CoCo 1, 2 and 3. *R.A.D. Products, 194 Hotchkiss Street, Jamestown, NY 14701, (716) 665-2124; \$34.95.*

F First product received from this company

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

— Judi Hutchinson

OWL-WARE

Proven Technology New CoCo 3 Utilities

Great for 512K Systems! From Color Venture and OWL-WARE

PRINTER LIGHTNING

A great print spooler which gives you 44K print buffer from a 128K CoCo and up to 438K (200 pages!) from a 512K CoCo. With this spooler you can run a program while you are printing a file. The spooler does not slow down the computer to any noticeable extent while you are running a second program and no lost characters arise. Baud rates selectable. *Printer Lightning* can reside in memory along with *RAMDISK*!

RAMDISK

Using 512K CoCo 3 you have access to 2 additional disk drives in RAM. All disk commands are supported, and the data are Reset button protected. You can now have up to 5 disk drive capacities on line at once and can assign the ram disks to any drive number. By making the ramdisk Drive 0, all programs which require a lot of drive access will run much faster. You can have the *RAMDISK* in memory at the same time as the *Printer Lightning*!

BACKUP LIGHTNING

This program is the fastest way to make backup copies of your files using a 512K CoCo. You can backup 35, 40, or 80 track disks single or double sided. Both RS and OS-9 disks may be backed up. The original disk is saved to memory and a copy can be made on an *unformatted disk* every 45 seconds! The lightning read, write, format, and verify routines that were developed make this program much quicker than RSDOS or OS-9 for backups. This will become one of your most used programs!

• **NEW** • **NEW** •

Only \$19.95 each. 3 for \$49.95.

SPECIAL With our 512K Upgrade (Next page) only \$2. each or 3 for \$5!

Announcing:

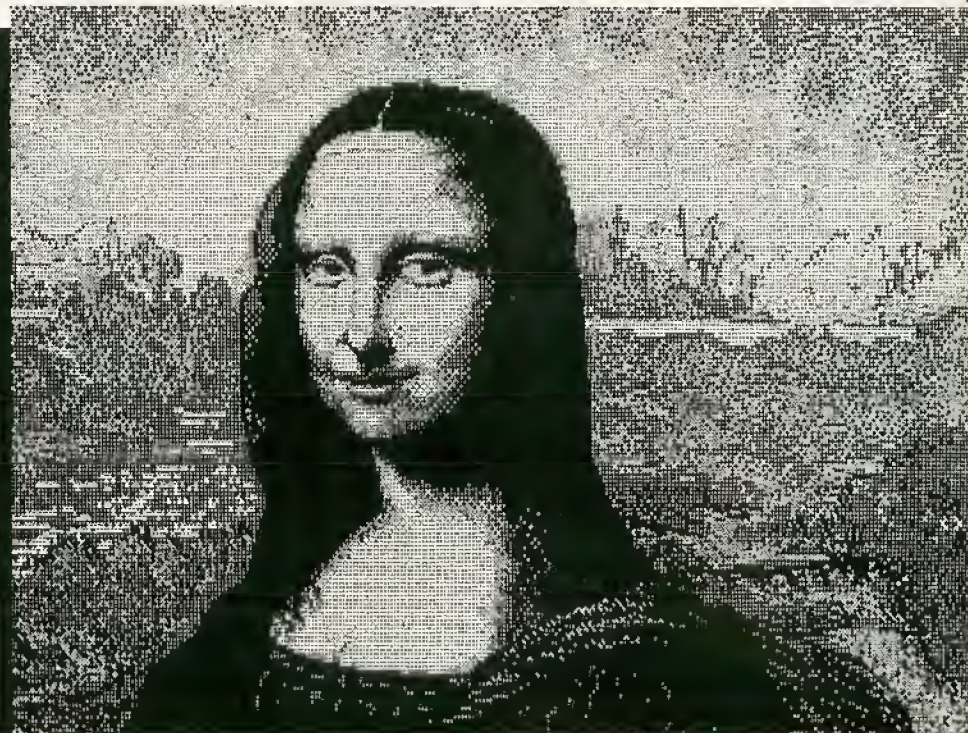
The finest graphics/drawing program for the COCO 3!

Da Vinci 3

- 16 colors on screen at one time
- Modify each color from 64 available colors
- Use composite or RGB monitor
- Draw with custom paintbrushes
- Full resolution 320 X 192
- Picture converter for conversion of COCO 2 pictures to COCO 3
- Multiple text fonts
- Accepts input from joystick, X-pad, mouse, or touch-pad
- Boxes, circles, line, paint generation
- Screen dump for Tandy mono and color ink-jet printers, (NX-10 and others pending)
- Sensible price
- No additional hardware required because of course/fine joystick movement modes
- Zoom mode for individual pixel editing
- Great on screen menu which is removable at the touch of a key to allow full screen edit

128K or 512K COCO 3

\$37.95



Super I/O Board for OS-9

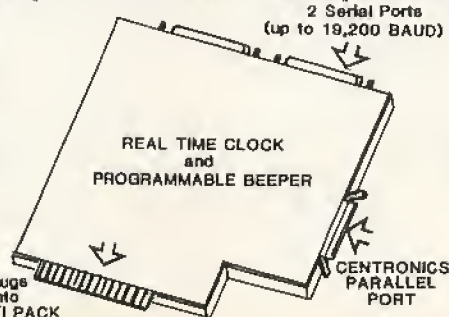
Each Board Provides 2 Serial Ports and Centronics Parallel Port

First Board has Real Time Clock and Beeper... With Second Board up to 5 Users

The serial ports are usable up to 19,200 Baud, and the parallel port is a true Centronics standard. Plug into your multi-pak. On CoCo 3, multi-pak must be upgraded. You will have a multi-user system with additional computers or terminals plugged into the serial ports. An OWL hard drive and 512K upgrade are strongly recommended for multi-user systems.

Intro Price... \$165.

BOARD 2... \$139.



OWL-WARE

P.O. Box 116-A

Mertztown, PA 19539

— ORDER LINES (only) —

(800) 245-6228

(215) 682-6855 (PA)

Proven Technology

On the Razor's Edge of the Color Computer Frontier

OS-9 Hard Drive Systems

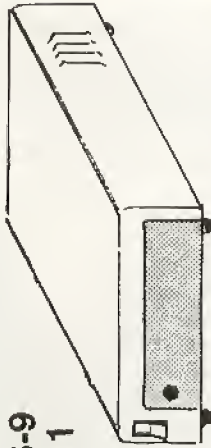
**Proven Performance for Demanding Home or Business Use
Drive Access is at Least 8 Times Faster than Floppy Drives
Control up to 2 Drives per Controller each as Continuous Storage**

Every hard drive system is complete with software, hard drive, controller, heavy-duty power supply, and LR Tech Interface. When a complete drive system is ordered, the drive is fully assembled, tested, and burned in for 3 full days. This ensures dependability and optimum performance.

We have now been supplying CoCo hard drive systems and parts for systems for more than 2 years. This is the longest history in the CoCo market of any available drive system. About 3/4 of all hard drive systems currently in use in the CoCo market use the LR Tech/OWL-WARE system. We have reached this position in the CoCo hard drive market by providing our customers with a quality product that they (and we) can be proud to own and use.

System Prices:		New!
\$469.	\$629.	\$759.
10 MEG	20 MEG	40 MEG

**For OS-9
Levels 1
and 2**



Dealer's Inquires Invited!

Hard Drive Interface (Includes Software)

For those who want to put together their own system, we have an exclusive arrangement to distribute the LR Tech Interface. Please note that an interface is not a controller. A Xebec, WD, or Adaptec SASI controller are required for a drive system.

To assemble a hard drive system yourself requires some reasonable knowledge of OS-9 and electronic construction and a hard drive that works. CoCo 3 users will have to upgrade their Multi-pak.

Only \$119.

Xebec Controller \$139.

CoCo 3 512K Upgrade

The LR Tech 512K upgrade uses all gold contacts and 120 nanosecond 256K chips. Provides large system memory from OS-9 Level 2.

Without Mem Chips	With Chips
\$59.	\$112.

Special! See software offer on previous page.

Hard Drive Basic

New For the CoCo 3!

In Answer for the Many Requests to Run BASIC from a Hard Drive

With the development of the CoCo 3, OWL Ware has been able to provide a truly professional Hard Drive System using OS-9. There has not, however, been a method of running your programs from the standard BASIC. With this latest development of the CoCo software, it is now possible to partition your hard drive into RSDOS and OS-9 sections. The OS-9 partition runs your OS-9 normally. The RSDOS section is further divided into a number of floppy sized units to run RSDOS programs. The familiar RS disk commands work normally.

There is little more that must be learned.

All of these RS drive sections are available at all times. It is not necessary to use assign commands and get access to only a few of these sections. Programs that use RS-BASIC should work as will all programs which do not force their own disk drivers.

Call about prices. This should be available by the time you read this ad!

OWL-WARE PHONES

ORDERS

(800) 245-6228

PA (215) 682-6855

TECHNICAL HELP

(215) 433-8695

Call for advice

DISK DRIVES

Ask for the WHISPER DRIVE for the finest, quietest drive available!

Drive 0 Systems (Full Hgt) \$169. (Half Hgt - DS) **\$229.**

Drive 0 systems complete with drive, controller, legal DOS, cable, case & power supply, and manual.

Drive 1 Systems (Full Hgt) \$95. (Half Hgt - DS) **\$135.**

New! New! (3.5" 720K Drive for OS-9) \$195.

Drive 1 has drive, case & power supply, and instructions for use with your drive.

(Call for Special Prices on Drive 0, 1, 2, 3 Combos.)

HALF HEIGHT DRIVE UPGRADE KIT FOR RS HORIZONTAL CASES

Why only double the capacity of your system when you can triple in the same case? Kit includes: double sided drive to fit your case, chip to run both sides of new drive, hardware, and detailed instructions. Takes only 5 minutes.

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500 501

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A modification to the ABC educational program

Sounding Out the ABCs

By John M. Linge

September 1987's issue of RAINBOW featured the program *ABC* by Ann B. Mayeux, which helps small children learn the alphabet. My 3-year-old, Regina, loved being able to "type" on the keyboard and get a colorful response with *ABC*.

However, it seemed to me that the program could be enhanced greatly by having the computer speak to her as she pressed the keys. When I scanned the listing, I saw that Mrs. Mayeux had written the program in such a way that I could readily patch it to take advantage of the Tandy Speech/Sound Pak to provide music and speech.

After a bit of trial and error, the program ABCMRG resulted. To use it, type in the listing, being careful to use the line numbers shown. The lines fit between the lines of the original program, except the ones I had to rewrite because of a conflict with Pak operation. Also, the apparent misspellings in the program are there purposely — the

As a systems engineer at a major aerospace company, John Linge has worked with a variety of operating systems and languages. At home, he enjoys using his CoCo for personal and family-oriented purposes.

Speech/Sound Pak does some odd things with the pronunciation of some properly spelled English words, so they must be misspelled in order to be pronounced correctly.

Save the program in ASCII form by entering `SAVE "ABCMRG/BAS"`. A. Rename the original *ABC* program as `"ABCOld/BAS"` in order to retain it in its original form as a backup, then load it and merge the two programs by entering `MERGE "ABCMRG/BAS"`. Save the merged program as *ABC*.

To run the new *ABC* program, you must have a Speech/Sound Pak installed in Slot 2 or Slot 3 of a Multi-Pak Interface, with the disk controller in Slot 4, as usual. The subroutine that starts at Line 3140 redirects the CoCo sound port to the Pak, and the subroutine starting at Line 3000 resets it. The data starting at Line 3230 is for the notes of the *ABC* song in the Pak's third octave. Each item to be said by the Pak is placed in the variable `LG$`, whose letters are poked into the Pak one at a time by the subroutine at Line 3060.

For each key pressed, the child is told "You pressed," followed by the letter he or she pressed. This helps a small child associate the letter shape with its name. For each graphic, the child is told that

the letter he or she pressed "is for" the graphic shown on the screen. For example, when the child presses A, the computer says, "You pressed A. A is for airplane. A is for alligator. A is for apple." I attempted to have the program identify the object as closely as possible

to the drawing of the object without rewriting the drawing routines, which were programmed very well by Mrs. Mayeux.

When Regina asks to type on "Daddy's computer," we load the modified program. She still enjoys the color and

immediate feedback of her actions, and she also hears the "robot" speak to her.

(Questions or comments about this modification may be directed to the author at 27 Apple Lane, Commack, NY 11725. Please enclose an SASE when writing for a reply.) ☐

Editor's Note: The modified ABC program will be placed on this month's RAINBOW ON TAPE and RAINBOW ON DISK instead of ABCMRG.

✓	410	.....	163	2405	.....	173
	985	.....	70	3160	.....	84
	1685	.....	185	END	.....	121

The listing: ABCMRG

```

49 ' PATCHES TO ABC/BAS TO USE S
/SC
50 W=&HFF7D: X=&HFF00: Y=&HFF7E
51 GOSUB 3000
52 POKE Y,&HAF:GOSUB 3170
53 FOR I=1 TO 2
54 READ X1: POKE Y,X1: GOSUB 317
0
55 NEXT I
61 PRINT@384,"MODIFIED FOR S/SC
BY JOHN LINGE";
62 FOR I=1 TO 43
63 POKE Y,8: GOSUB 3170: POKE Y,
0: GOSUB 3170
64 READ X1,X2,X3
65 FOR J=1 TO X3
66 GOSUB 3140
67 POKE Y,0: GOSUB 3170: POKE Y,
X2: GOSUB 3170
68 POKE Y,1: GOSUB 3170: POKE Y,
X1: GOSUB 3170
69 POKE Y,8: GOSUB 3170: POKE Y,
10: GOSUB 3170
70 NEXT J

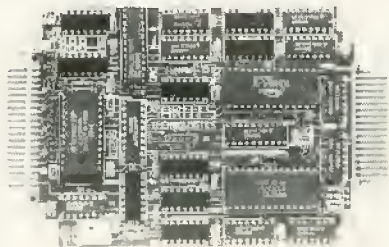
```

```

71 NEXT I
72 POKE Y,8: GOSUB 3170: POKE Y,
0: GOSUB 3170
73 POKE Y,&HFF: GOSUB 3170
74 CLS
135 IF A$>="A" AND A$<="Z" THEN
LG$="YOU PRESSED "+A$: GOSUB 307
0
410 PCLS2: SCREEN1,0
435 LG$="AIRPLAYN": GOSUB 3040
485 LG$="AELLIGAYTOR": GOSUB 304
0
495 LG$="APPLE": GOSUB 3040
510 PCLS: SCREEN1,0
525 LG$="BOWT":GOSUB 3040
545 LG$="BIRD": GOSUB 3040
555 LG$="BALLOONS": GOSUB 3040
590 PCLS:SCREEN1,1
605 LG$="CLOUD": GOSUB 3040
655 LG$="CAR": GOSUB 3040
665 LG$="CAT": GOSUB 3040
680 PCLS:SCREEN1,1
695 LG$="DOOR": GOSUB 3040
725 LG$="DAWGG": GOSUB 3040
735 LG$="DISH": GOSUB 3040
750 PCLS:SCREEN1,1
755 LG$="EXIT": GOSUB 3040
775 LG$="ELEPHANT": GOSUB 3040
820 PCLS2: SCREEN1,0
825 LG$="FRAWG": GOSUB 3040
875 LG$="FLOUERS": GOSUB 3040
900 PCLS:SCREEN1,1
905 LG$="GAYT": GOSUB 3040
955 LG$="GRAPES": GOSUB 3040
985 LG$="JIHRAFF": GOSUB 3040
1020 PCLS: SCREEN1,1
1035 LG$="HELICOPTER": GOSUB 304

```

DMC "No Halt" Disk Controller



Unleash your CoCo's potential!

Our new Dual Mode Controller (DMC) implements a new "no halt" mode of operation so it can read from or write to disk all by itself. The 6809 is freed to process other tasks and respond to interrupts. This is how OS-9 was meant to run! But the Radio Shack "halt" mode of operation is also retained to maintain full compatibility with existing non-OS-9 software.

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Did you know?

...that all the older floppy disk controllers for the CoCo completely tie up (and even halt) the 6809 processor during disk reads and writes? No wonder your keyboard is constantly "losing" characters! Or that your serial port often gives you garbage.

```

Ø
1Ø55 LG$="HOUSE": GOSUB 3Ø4Ø
11ØØ PCLS6: SCREEN1,1
11Ø2 DRAW"BM175,4ØR25D15L5D81R5D
15L25U15R5U81L5U15":PAINT(185,5Ø
),8,8
1115 LG$="ICE CREAM": GOSUB 3Ø4Ø
113Ø PCLS3:SCREEN1,Ø
1135 LG$="JAK IN THE BOX": GOSUB
3Ø4Ø
122Ø PCLS:SCREEN1,1
1235 LG$="KAEET":GOSUB 3Ø4Ø
1255 LG$="KEY": GOSUB 3Ø4Ø
1325 LG$="KANGUHHROO": GOSUB 3Ø4Ø
134Ø PCLS3: SCREEN1,Ø
1345 LG$="LEAVES": GOSUB 3Ø4Ø
1375 LG$="LAYDEYBUG": GOSUB 3Ø4Ø
141Ø PCLS: SCREEN1,1
1415 LG$="MOUNTENS": GOSUB 3Ø4Ø
1425 LG$="MAILBOX": GOSUB 3Ø4Ø
1435 LG$="MOON": GOSUB 3Ø4Ø
149Ø PCLS: SCREEN1,1
1495 LG$="NEST": GOSUB 3Ø4Ø
1525 LG$="NIGHT": GOSUB 3Ø4Ø
156Ø PCLS: SCREEN1,1
1565 LG$="AOUL": GOSUB 3Ø4Ø
1615 LG$="OTION": GOSUB 3Ø4Ø
1635 LG$="OCTOWPUS": GOSUB 3Ø4Ø
168Ø PCLS: SCREEN1,1
1685 LG$="PICTURE": GOSUB 3Ø4Ø
1695 LG$="PUMPKIN": GOSUB 3Ø4Ø
1715 LG$="PAPER": GOSUB 3Ø4Ø
1725 LG$="PENCIL": GOSUB 3Ø4Ø
178Ø PCLS: SCREEN1,1
1785 LG$="QUILT": GOSUB 3Ø4Ø
1825 LG$="QUEEN": GOSUB 3Ø4Ø
189Ø PCLS3: SCREEN1,Ø
19Ø5 LG$="ROCKET": GOSUB 3Ø4Ø
1955 LG$="RAINBOW": GOSUB 3Ø4Ø
1975 LG$="RABBIT": GOSUB 3Ø4Ø
2Ø2Ø PCLS3: SCREEN1,Ø
2Ø25 LG$="SUN": GOSUB 3Ø4Ø
2Ø45 LG$="SIGN": GOSUB 3Ø4Ø
2Ø55 LG$="SNAKE": GOSUB 3Ø4Ø
2Ø85 LG$="STREET": GOSUB 3Ø4Ø
21ØØ PCLS: SCREEN1,Ø
2115 LG$="TRUCK": GOSUB 3Ø4Ø
2145 LG$="TREE": GOSUB 3Ø4Ø
219Ø PCLS3: SCREEN1,Ø
22Ø5 LG$="UMBERELLA": GOSUB 3Ø4Ø
225Ø PCLS: SCREEN1,1
2255 LG$="VYIOWLIN": GOSUB 3Ø4Ø
2315 LG$="VAZE": GOSUB 3Ø4Ø
2335 LG$="VYOWLETS": GOSUB 3Ø4Ø
236Ø PCLS2: SCREEN1,Ø
2365 LG$="WIHNDOW": GOSUB 3Ø4Ø
24Ø5 LG$="WATERMELON": GOSUB 3Ø4
Ø
244Ø PCLS2: SCREEN1,Ø
2445 LG$="XYLOWPHONE": GOSUB 3Ø4
Ø
249Ø PCLS2: SCREEN1,Ø
2535 LG$="YELLOW YARN": GOSUB 3Ø
4Ø
255Ø PCLS: SCREEN1,1
2585 LG$="ZEEBRA": GOSUB 3Ø4Ø
26Ø5 LG$="ZOO": GOSUB 3Ø4Ø
3ØØØ ' INITIALIZE S/SC
3Ø1Ø GOSUB 314Ø
3Ø2Ø POKE W,1:GOSUB317Ø: POKE W,
Ø:GOSUB317Ø
3Ø3Ø RETURN
3Ø4Ø ' SET UP LEGEND FOR KEYPRES
S
3Ø5Ø LG$=A$+" IS FOR "+LG$
3Ø6Ø ' SAY LEGEND
3Ø7Ø POKE X+1,52: POKE X+3,63: P
ØKE X+35,6Ø
3Ø8Ø FOR I=1 TO LEN(LG$)
3Ø9Ø POKE Y,ASC(MID$(LG$,I,1)):G
ØSUB 317Ø
31ØØ NEXT I
311Ø POKE Y,13:GOSUB317Ø
312Ø FOR DL=1 TO 1ØØØ:NEXT DL
313Ø RETURN
314Ø ' SET UP S/SC
315Ø POKE X+1,52: POKE X+3,63: P
ØKE X+35,6Ø
316Ø RETURN
317Ø ' CHECK FOR S/SC READY
318Ø IF PEEK(Y) AND 128 = Ø THEN
318Ø
319Ø RETURN
32ØØ ' ABC SOUND DATA
321Ø ' ENABLE CHANNEL A ON MIXER
322Ø DATA 7,254
323Ø ' ABC SONG DATA
324Ø ' CC GG AA G
325Ø DATA 1,172,2, 1,172,2, 1,29
,2, 1,29,2, Ø,254,2, Ø,254,2, 1,
29,4
326Ø ' FF EE DDDD C
327Ø DATA 1,64,2, 1,64,2, 1,83,2
, 1,83,2, 1,125,1, 1,125,1, 1,12
5,1, 1,125,1, 1,172,4
328Ø ' GG F EE D
329Ø DATA 1,29,2, 1,29,2, 1,64,4
, 1,83,2, 1,83,2, 1,125,4
33ØØ ' GGG F EE D
331Ø DATA 1,29,1, 1,29,1, 1,29,1
, 1,64,4, 1,83,2, 1,83,2, 1,125,
4
332Ø ' CC GG AA G
333Ø DATA 1,172,2, 1,172,2, 1,29
,2, 1,29,2, Ø,254,2, Ø,254,2, 1,
29,4
334Ø ' FF EE DD C
335Ø DATA 1,64,2, 1,64,2, 1,83,2
, 1,83,2, 1,125,2, 1,125,2, 1,17
2,6
336Ø ' TURN OFF CHANNEL A SOUND
337Ø DATA Ø,Ø,Ø

```


TEXTPRO - IV

"The ULTIMATE Color Computer III Word Processing System"

9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
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TEXTPRO IV is the most Powerful Word Processing System available for the COCO-3, designed for speed, flexibility and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional printing, then most likely you'll be better off with one of the other simple word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is the answer. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time consuming and frustrating menu chases, you are in total control at all times. You can display the formatted document on the screen before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts. Take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All of the character sets used on this AD are proportional, all centering, justification, font selection, and text printing was performed automatically by TEXTPRO IV.

What you see is what you get!

TEXTPRO IV has 9 Hi-Resolution screen fonts to choose from, with 58 to 212 characters per line in 225 Resolution, for the best display possible. You can easily match the width of your printed page to the screen and you can have it automatically change display widths as you change printer fonts so you can even display the "fine print". All of the screen fonts can display, Bold, Italic, Underline, Superscript, Subscript and Double Width characters. When you want to see what your printed document will look like, TEXTPRO IV will let you see it on the screen in all its glory, so that, "What you see is what you get".

Standard Commands

TEXTPRO IV has all the document formatting commands you expect in a word processor and then some. The setup commands include: line length, top margin, bottom margin, page length, page numbering on/off, page format on/off, automatic word fill on/off and justification left, center, right or full. Some of the Vertical control features include: Test for a number of lines left on a page, skip to next page, set page number, page pause, single and multiple line spacing.

TEXTPRO IV features 3 programmable Header lines that can be centered, left or right justified and one programmable Footer line. There are 3 commands for continuous, single and paragraph indenting, Center Text, Center Line and Right Justify text with character fill.

Printer & Special Commands

TEXTPRO IV has 8 pre-defined printer & screen commands for Bold, Italic, Double Width, Underline, Subscript, Superscript, Condensed and Double Strike print. It also has 10 programmable functions that you can use to access intelligent printer features like: Graphics, variable line spacing, half line feed, horizontal & vertical positioning. There are also 3 other printer commands that allow you to imbed control code sequences anywhere in the text.

There is a Footnote command that will automatically place footnotes at the bottom of the page. Another command allows you to display a message on the screen and input text from the keyboard, to be included in your printed document. There is also a repeat command that allows you to repeat an entire document or part of one, up to 255 times.

Tab Functions

TEXTPRO IV features an elaborate system of tab commands for complete control over column formatting. There are 10 programmable tab stops that can be defined and re-defined at any time. They can be used to: Center over Tab column, Right Justify to Tab column, Decimal Align over Tab column, Left Justify to Tab column (Normal Tab) and Horizontal Tab. They can also be used with a numeric column position for maximum flexibility.

Proportional Fonts & Printing

TEXTPRO IV is the only Color Computer III Word Processing system that gives you Justified Proportion Printing, which can give your documents and letters that professional touch that just isn't obtainable with fixed or mono spaced printing. And just about all printers today support proportional fonts, and with Laser Printers you can get typesetting quality output for just pennies a page. TEXTPRO IV supports up to 9 proportional fonts, with full justification. And, you can even mix mono spaced and proportional fonts for maximum flexibility. Even if you don't use proportional printing, you can select between Pica, Elite and Condensed fixed width fonts to get fully justified printing.

Mail Merge and Text Processing Disk Functions

TEXTPRO IV supports several commands that allow you to import data or text from other disk files. They allow you to include information like names and addresses for Mail Merge capability. Import standard paragraphs or other information for Boiler Plate type functions and more. Some of the commands include: Open a file, Field a Record, Read a Record into fielded variables, Read single or multiple lines and Trim spaces from the trailing end of fielded variables.

Another powerful disk function not to be overlooked is the "LIBRARY" command that allows you to include the entire contents of a file in your text. This can be very useful for a great many applications. You can use a Library command to automatically include a standard or optional printer setup command file, or to include standard paragraphs, headers or information created from a spread sheet or any other program. And, for printing very large documents that consist of several files linked together.

Autoexec Startup Files

TEXTPRO IV will automatically load and execute a command text file when it first executes. This allows you to customize the program configuration for your system and printer whenever you startup TEXTPRO IV. You can setup the screen display format, colors, adjust automatic key repeat, printer baud rate, load a set of function keys, load your printers control codes and more.

80 Programmable Function Keys

TEXTPRO IV allows you to have up to 80 function keys with just about any kind of information or command sequences you can imagine. Once programmed, you can have a command sequence execute using a single function key. You can also Save and Load function key sets at any time. So, you can have several sets for different writing tasks or projects, the possibilities are endless. Just think, with a single function key you could, load a disk file, search for and replace all the occurrences of a phrase, save the file back to disk, have it processed and printed!

Text Editing

TEXTPRO IV has a powerful, full featured, line oriented screen editor that is faster and more efficient than most editors you've ever worked with. It supports single or multiple line copy and move, global or local search and replace, word and character insert/delete, block delete and much more. It features adjustable automatic key repeat, selectable display foreground and background colors, screen line width and more.

TEXTPRO IV uses fully compatible ASCII formatted files. You can even direct formatted output files to a standard ASCII disk file. It will Load, Save, Append, Kill, Text Process files from disk, Roll part of a file to disk, Get next portion of a file, display a Directory and Backup Ramdisk to & from Floppy disks.

TEXTPRO IV's files are also compatible with spelling checker programs like Spell 'n Fix from Star Kits, a shareware program, available with TEXTPRO IV for your evaluation, just for the asking.

Fully Buffered Keyboard

While many word processing programs are slow and often lose keystrokes, TEXTPRO IV has a fully buffered keyboard that is virtually impossible to out type. Even when it's busy, it will still remember the keystrokes entered. You can enter in commands or whatever, even during insert mode you'll never lose a key.

Professional Word Processing Power

TEXTPRO IV is a powerful tool for both the Casual and Professional Word Processing user. It offers a wide range of features and functions that can satisfy even the most demanding writer. Even though you may not need all of TEXTPRO IV's power and flexibility right now, its not a program that you can easily outgrow. As your needs and skills improve, you'll discover that you won't need to go out and buy another word processing program, TEXTPRO IV will already be ready and waiting. No Text Processing program available for the Color Computer III gives you more Text Processing Power than TEXTPRO IV. It can make your writing appear more professional than you ever thought possible. Check around, see what other word processing programs have to offer in terms of power, speed and flexibility. When your finished comparing them against TEXTPRO IV, you'll see that it's the only real choice for the Color Computer III.

Requires 128K & Disk \$89.95

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Coming Soon: CoCo 1 & 2 versions of TEXTPRO IV

BattleLine Topic No. 1 was announced in mid-October by **Greg Miller** (GREGMILLER) with this question: *Does the high cost of software make piracy just?* Several people took the opportunity to put in their two bits, and it is interesting to note that few users took the position that high software prices justify piracy.

For those new to the game, "BattleLine" refers to the discussion of controversial topics on Delphi. These topics are chosen and announced about once a month, and all users are invited to join in and let their opinions be known. To participate, send your messages in Forum. Also, stick around for the open conference that's held toward the end of the BattleLine period.

If you missed anything, don't worry — all Forum messages and a complete log of the resulting conference will be placed in the Archives area of the database for later perusal by any SIG member. The archive of the piracy BattleLine is there now. Be forewarned, however, that the information is over 100K in size. The main archive file has been broken into several smaller files, which should help those whose terminal programs don't support direct-to-disk file transfers.

As the size of the archive file implies, the first BattleLine seemed to go quite well. Several users responded to the chosen topic and aired their thoughts and feelings. All in all, not too many low blows were thrown (although it might help to see more of these!).

If the topic interests you, download the appropriate files. You can still respond to the issue — kick it around some more and see what you come up with. Nothing says we can't pick the same (or a closely related) topic twice.

We expect the number of users to increase as BattleLine continues. It is part of human nature to want to join in. And the best part of the "battle" is that if you disagree with someone else, you can't get punched in the nose! BattleLine won't leave any casualties; rather,

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

Delphi's Online Debate Team

By **Cray Augsburg**
Rainbow Technical Editor

it can help us all to understand the impact of certain topics.

By the way, BattleLine topics are not limited to computer-related discussion only. If you have ideas for BattleLine, any "hot" thoughts in your heart or mind, let them be known. Send a Forum

message to Greg Miller, who will spread the word among the staff, which will then choose a topic. You should keep in mind that in these infant stages of BattleLine we are learning to better serve you as members of the SIG. We need your feedback to make this work.

Resource to Delphi

We just received our copy of the new book *DELPHI: The Official Guide*. This book, written by **Michael A. Banks** (KZIN) of the Science Fiction SIG, is 487 pages long and literally jammed with information about Delphi. The information contained in the book is broken into four parts:

Getting Started covers the basics of telecommunications. It also details the basics of the Delphi menu and command systems, ending with a presentation and discussion of the Delphi Main Menu selections.

The DELPHI Member Handbook explains in its 16 chapters major aspects of how to utilize Delphi to the fullest. Topics covered include Business & Finance, Conference, DELPHI Mail,

Database Report

By **Don Hutchison**
Rainbow's Delphi Database Manager

Both OS-9 Online and the CoCo SIG have been very busy since the October Princeton RAINBOWfest. Many users purchased software at the 'fest and are now using it to produce utilities, pictures and other programs that they wish to share with the CoCo population. Our uploading activity following the 'fest was extremely lively! We even uploaded one very popular file, CoCo3FIX.BAS, from the 'fest!

OS-9 Online

In the General Information topic area, **Jim Johnson** (REINDEER) uploaded a "typewriter graphic" file that describes

Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

how to convert 3½-inch disk drive connectors to the type used by 5¼-inch drives. This file is of importance to OS-9 users because his modifications will allow 3½-inch drives of the 720K double-sided, 80-track variety to be used with the existing CoCo disk controller circuitry. **Jim Manning** (JIMBM) uploaded a program that enables booting with 80 columns and using the VDG screen in another window. **Greg Law** (GREGL) sent us a shell script file to merge BASIC09 and RUNB with SYSCALL, INKEY and GFX2 to alleviate the popular Error #043. **Rix Seacord** (RIX) gave us a review of the new "no halt" DMC controller from Sardis Technology.

In the Programmers Den topic area, Greg Law uploaded a total of eight routines. Included are a CRC checksum calculation routine for Xmodem/Ymodem, a day of the week calculator, a reverse string routine, a Julian date calculator, integer to ASCII (and vice versa) routines, an ASCII to double precision routine, and a C program for executing any OS-9 system call directly from the command line. The

CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only available to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/PUT, H/PLAY and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with ease to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximately 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk \$149.00

DATA PACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM AUTOPILOT & AUTO-LOG PROCESSORS X-MODEM DIRECT DISK FILE TRANSFER VT-100 & VT-52 TERMINAL EMULATION

- * No lost data even at 2400 Baud on the CoCo-3 Serial I/O port.
- * 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- * 50K Text Buffer when using the Hi-Res Text Display & Disk.
- * ASCII & BINARY disk file transfer support via XMODEM.
- * Directly record receive data to a disk file (Data Logging).
- * VT-100 terminal emulation for VAX, UNIX and other systems.
- * VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- * Programmable Word Length, Parity, Stop Bits and baud rates.
- * Complete Full and Half Duplex operation, with no garbled data.
- * 9 Variable length, Programmable Macro Key buffers.
- * Programmable Printer rates from 110 to 9600 baud.
- * Send Files directly from the Buffer, Macro Keys or Disk.
- * Display on Screen or Print the contents of the Buffer.
- * Freeze Display & Review information On Line with no data loss.
- * Built in Command Menu (Help) Display.
- * Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, \$59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based Co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- * Supports Local and Global string search and/or replace.
 - * Full Screen line editing with immediate line update.
 - * Easy to use Single keystroke editing commands.
 - * Load & Save standard ASCII formatted file formats.
 - * Block Move & Copy, Insert, Delete, Overtyping.
 - * Create and Edit files larger than memory.
- The Assembler portion of EDT/ASM III features include:
- * Supports the full 6809 instruction set & cross assembles 6800 code.
 - * Supports Conditional IF/THEN/ELSE assembly.
 - * Supports Disk Library file (include) up to 9 levels deep.
 - * Supports standard Motorola assembler directives.
 - * Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
 - * Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk \$59.95

TEXTPRO IV

The ADVANCED COCO-3 Word Processing System"

- * 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- * On Screen Display of Bold, Italic, Underline & Double Width print.
- * Up to 8 Proportional Character Sets Supported with Justification.
- * Up to 80 Programmable Function Keys & Loadable Function key sets.
- * Fully Buffered keyboard accepts data even during disk access.
- * Autocorrect Startup files for easy printer & system configuration.
- * 8 Pre-Defined Printer function commands & 10 Programmable ones.
- * Supports Library files for unlimited printing & configurations.
- * Disk file record access for Mail Merge & Boiler Plate printing.
- * Completely Automatic Justification, Centering, Flush left & right.
- * Change indents, margins, line length, etc. anytime in the text.
- * Create and Edit files larger than memory, up to a full disk.
- * Easily imbed any number of printer format and control codes.
- * Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexibility and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing, then TEXTPRO IV is what you're looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text you're working on. There are no time consuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk \$89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- * 54 Different Character Sizes available from 14 to 212 epl.
- * Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- * Double Width, Double Height and Quad width characters.
- * Scroll Protect form 1 to 23 lines on the screen.
- * Mixed Text & Graphics in HSCREEN 3 mode.
- * PRINT @ is available in all character sizes & styles.
- * Programmable Automatic Key repeat for fast editing.
- * Full Control Code Keyboard supported.
- * Selectable Character & Background color.
- * Uses only 4K of Extended (2nd 64K) or Basic RAM.
- * Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. HI-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk \$34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in your CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk \$19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- * Automatic label generation and allows specifying FCB, FDB and FCC areas.
- * Disassemble programs Directly from disk, unlike other disassemblers.
- * Automatically locates Begin, End and Execution address.
- * Output Disassembled listing with labels to the Printer, Screen or both.
- * Generates Assembler source files directly to disk or printer.
- * Built in Hex/Ascii dump/display to locate FCB, FCC & FDB areas.
- * 8 Selectable Display formats 32/40/64/80 columns in 192 or 225 Res.
- * Selectable foreground & Background colors & Printer Baud rates.
- * Built in Disk Directory an Kill file commands.
- * Menu display with single key commands for smooth, Easy operation.
- * Written in Ultra Fast Machine Language.

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Electronic Mail, Entertainment, Groups and Clubs, People on DELPHI, Workspace, Using DELPHI, HELP and Using the OnlineText Editors.

DELPHI Users Guide describes various shortcuts you can use to maximize the benefits of using Delphi. Applications of Delphi to your personal and business life are covered, as well.

Reference contains four appendices: Index to DELPHI Services, DELPHI Membership Agreement, Trouble-shooting and Dial-Up Guide (access numbers for Tymnet, Telenet and Data-pac).

DELPHI: The Official Guide is well-written and well-organized. The information is presented in a logical manner and is, therefore, very useful for the beginning, intermediate or advanced user. The book, which can be ordered online, costs \$19.95. To order online, first go to the Delphi Main Menu. Select Using-DELPHI and then Manuals. Finally, choose Order DELPHI Guide and answer the questions appropriately. We think you will appreciate the value of the book as well as the effort Mr. Banks has put forth to ensure the clarity, accuracy and completeness of the information it contains. □

program will perform the system call requested, give a dump of all the registers, and then exit with the status code indicated from the system call itself.

In the Users Group topic area, **Dennis Weldy** (OS9ER) provided DL.ASM, a deleting utility that accepts names from a pipe; DISKID, which allows the user to rewrite the disk name and date on a disk after BACKUP has overwritten it; DISKCAT.B09, a BASIC09 utility to print a hierarchical directory of a disk to the printer; DIRW.C, for providing directories with wild cards; and DIR.ASM, a directory utility for 64-column screens.

In the Utilities topic area, Greg Law provided ECH, a slightly different version of ECHO that accepts control characters on the command line. **Rick Adams** (RICK-ADAMS) provided an updated CC2 command for use with the C compiler package that combines the C.PREP, C.PASS1, C.PASS2 and C.OPT steps via pipes.

In the Telecom topic area, **Bob Montowski** (GRAPHICSPUB) uploaded the BASIC09 BBS package that he used formerly. **Bill Brady** (WBRADY) sent us BT, a simple terminal program written in BASIC for those who have an Atari ST and only the personal pak.

In the Graphics & Music topic area, **Pat Abramovitch** (HUBBS) uploaded a program that draws a "512K on board" sign

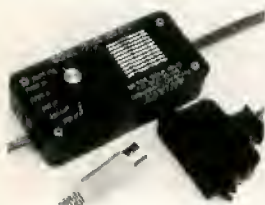
on a 40-column graphics screen. (He says he was inspired by Rick Adams' *Rickey-term* macros.) **Toni Ryan** (TNTRHODAN) sent us a new 512K version of his popular *BDraw* program, written in BASIC09. **Steve Clark** (STEVECLARK) provided us with his *MacPaint* picture display and print utility for Level II. He included documentation as well as the C source code. Rick Adams gave us a WLABEL command that will put a Macintosh-style window label at the top of all your windows. Rick also uploaded a COLOR command for Level II, including C source code.

CoCo SIG

In the General Information topic area, **Kevin Nickols** (NICKOLS) posted the Tandy newsletters for September and October. **Marty Goodman** (MARTYGOODMAN) posted his report on RAINBOWfest. I provided a patch for the CoCo 3 demo program from Spectral Associates that provides enhanced disk performance for those with high-performance drives.

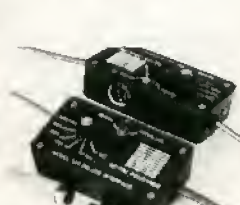
In the CoCo 3 Graphics topic area, **David Mills** (DAVIDMILLS) uploaded his picture of the White House, which won first prize in November's CoCo Gallery. **Mark O'Pella** (MDODELPHI) sent us his KALISCOP.BAS program. **David Tilman** (DAVIDTILMAN) provided us with some nifty palette animation and preset motion

Model 101 Interface \$39.95



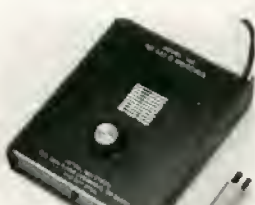
- Serial to parallel interface
- Works with any COCO
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 - Size is 4.5" x 2.5" x 1.25"
 - Comes complete with cables to connect to your computer and printer

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- Connect to your COCO serial port and have 3 switch selectable serial ports
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The Model 101 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Itoh, Seikosha, Panasonic and many others. They support BASIC print commands, word processors and graphic commands.

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- U.L. listed foil-shielded cable
- 2 Types: male/female extension cables (used between a serial device and existing cable) male/male cables (used between two serial devices such as a modem and one of our switchers).
- 3 ft./\$3.95, 6 ft./\$4.49, 10 ft./\$5.59 Specify M/M or M/F and length.

The 101 and 104 require power to operate. Most printers can supply power to your interface. (Star, Radio Shack and Okidata are just a few that do - Epson and Seikosha do not). The interfaces can also be powered by an AC adaptor; Radio Shack model 273-1431 plugs into all models. If you require a power supply, add a "P" to the model number and add \$5.00 to the price. (Model 101P \$44.95, Model 104P \$56.95).

utility programs. I uploaded MGE pictures of two lovely ladies, and a picture of Lonnie Falk for contrast. **Jason Forbes** (COCO3KID) gave us some more converted Atari ST pictures and a program to display two-dimensional fractal designs. **Jeff Butler** (JEFFBUTLER) sent us his MGE-to-CM3 converter utility. **Bruce Farrington** of Computize (BFCOMPUTIZE) kindly provided the *Color Max Deluxe* cycling demos that he used at RAINBOWfest (these were uploaded at the request of several 'fest-goers). **Bob Montowski** (GRAPHICSPUB) became very popular with the male SIG members this month by providing 24 digitized Playmate pictures. **Ana Landa** (ANA) provided several Halloween pictures that were converted from her original PMODE 4 drawings. **Craig Luecke** (LUECKE) uploaded two pictures in the new GIF format, since *Color Max* is now capable of reading this format. Craig also sent us his clip set of vegetables and fruits and a *21 Jump Street* calendar. **Richard Trashborg** (TRAS) uploaded a Playmate picture, the entire *CoCo Max III* demo disk, his first cycling picture (called "Snake") drawn under *CoCo Max III*, and the second in his series of "Coloring Book" pictures. Richard also uploaded an erotic picture called "Marabel," which was originally drawn by Mike Trammell. **Michael Schneider** (MSCHNEIDER) pro-

vided MAX.MGE, a few adult MGE pictures, and a picture of Albert Einstein.

In the Classic Graphics topic area, **Jason Forbes** uploaded a program that displays two-dimensional fractal designs.

In the Source for 6809 Assemblers topic area, **Roger Krupski** (HARDWAREHACK) uploaded a CoCo reader for the Speech and Sound Pak, and a "remote host" utility. I provided a high-speed utility for comparing two machine language disk files.

In the Utilities & Applications topic area, **Michael Schneider** uploaded the *Spell 'n Fix* programs. **Kurt Stecco** (HIGH-RAILER) uploaded a program for the CoCo 3 that will print gift certificates on a DMP printer. I uploaded a program of patches for the CoCo 3 DOS that was given to me at RAINBOWfest by its author, **Vernon Nemitz**.

In the Hardware Hacking topic area, **Randy Poppe** (RPOPPE) provided us with the schematic diagram for the Hi-Res joystick input module used by *CoCo Max III*. The file is in the form of a *CoCo Max III* picture file. **Paul Schmidt** (PAULK9PS) sent us instructions concerning converting the Deluxe RS-232 pack to modem pack addressing. **Jim Johnson** provided two informative hardware articles. The first one described how to convert the data and power connectors for 3½-inch disk drives

to the type of connectors used by the older 5¼-inch drive systems. This information is of particular value because once the matter of the different connectors is fixed, 3½-inch drives of the 720K double-sided, 80-track variety will work with the existing CoCo disk controller circuitry. **Jim's** second article provided information concerning the new model No. 26-3124 multipack in the form of a "typewriter graphic" schematic. I provided a file that describes some cautions and advice for those who may be considering installing a second phone line for exclusive use with their computer.

In the Music & Sound topic area, **Mark Raphael** (MARKRAPHAFL) sent us two more *Musica* files, *Sunny Side* and *Rainy Day*.

In the Games topic area, **David Tilman** sent us two games, *HAVA1* and *HAVA2*.

In the Data Communications topic area, **Mike Andrews** (MANDREWS) uploaded a patch for Version 2.0 of *Rickeyterm* that provides Ymodem downloading capabilities. Delphi supports the efficient Ymodem protocol, so this patch is sure to be popular among *Rickeyterm* users. **Gerry Thomas** (INET191) uploaded the documentation file for *Ultimaterm*.

As you can see, we have a lot of new and very good material online for our CoCo users. See all of you online on Delphi!

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Rainbow Review 3/85. Hot CoCo 10/85

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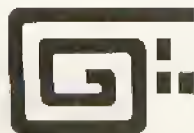
Rainbow Review 7/85, Hot CoCo 9/85 "The graphics bargain of the year"

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CATALOG

In the September 1987 issue of *RAINBOW* (Page 150), I wrote an article on how to build an EPROM emulator using a RAM chip backed up with a battery. That was all well and good, and I thought that was the end of that. But it wasn't. A reader called me up and told me about his problem with the emulator — he had a problem erasing it.

A regular EPROM has a specific method of erasing — you need an EPROM eraser. All EPROMs have a window on top that allows you access to the chip's memory cells. Exposing that window to ultraviolet light erases all data in the EPROM.

When an EPROM is new, and every time you erase it, the EPROM memory cells contain "logical 1"; or, in the case of an eight-bit EPROM, a Hex value of \$FF (that is, eight logical high levels). When you program an EPROM, the logical 1 changes to a logical 0. And there is only one way the programmer can change that cell back to a logical 1 — use an eraser.

Since the chip I used was a RAM instead of an EPROM, my EPROM emulator had no window. You could not erase it with an EPROM eraser, but that did not seem to be a problem. Unlike an EPROM, a RAM chip cell can be changed to a logical 1 just by writing to it. In most cases, all you had to do was plug the RAM-based EPROM emulator and run the programmer software. No problem, the emulator was programmed.

There are always exceptions to the rule. In sync with today's world of "faster is better," the people who wrote EPROM programmer software were looking for faster ways to program an EPROM, each cell of which has to be programmed separately. Each EPROM cell takes a small fraction of a second to program, which does not seem like a very long time; but with EPROMs getting bigger and bigger, those "fractions" add up, and it takes longer and longer to program them.

The software experts thought of one way to shorten the programming time: Since an EPROM contains all \$FFs when it is new and just after it is erased,

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

Build an . . .

Electronic EPROM Emulator Eraser

By Tony DiStefano
Rainbow Contributing Editor

why not use that fact when programming? So, when the software is programming an EPROM, it first checks to see if the present data byte to be programmed is \$FF. If it is, the software doesn't bother to program that byte, as it is already an \$FF on the EPROM. Instead, it goes on to the next byte. The more \$FFs there are in the data to be programmed, the faster it goes. Makes sense, doesn't it? Right! To further aggravate the problem, some EPROM programmers check for \$FFs and won't even start if your EPROM isn't right.

Now, that is a problem. You can't erase the EPROM emulator with an eraser, and you can't program \$FFs into it. You can't even unplug the battery to let the memory "forget"; that would make the EPROM emulator all zeros. What are you to do? Well, here is the answer. Build an Electronic EPROM Emulator Eraser. Wow, what a mouthful! But it will solve your problem.

Building It

To start with, you will need the standard tools you usually use on a project: soldering iron, solder, cutters, screwdrivers and the like. The parts list shows you what you will need. Some of these parts are not available at your local Radio Shack store, but they

should all be available at a good electronics store.

Note that this project does not have to be plugged into a CoCo to work, and is completely self-contained. However, it does need a 5-volt supply. If you build it on a CoCo-compatible proto-board, you can get 5 volts from the CoCo's power supply. The 5-volt supply is available on Pin 9, and ground is on Pin 33.

First, let's start off with some theory. The EPROM emulator is mainly a RAM chip, so let's review our knowledge of RAM chips. Basically, this RAM chip has 13 address lines (A0 to A12), eight data lines (D0 to D7), one read/write line and some ChipEnable lines. Since this chip is emulating an EPROM, all lines are about the same except for the read/write line. It changes to the program (PGM) line. What we have to do is program the chip for \$FFs, so all DATA lines are tied to Vcc, which is 5 volts and logical 1, using the PGM pin (See Figure 1) to strobe this data (always \$FF) to the chip.

Every memory location has to be programmed this way. The easiest way to access every location is to do them in sequence, one at a time. For that you need some binary counters. Two of them will have enough bits to cover all addresses. In fact, if you study Figure 1, you will see the counters I am using are 74LS393. Each of these packages have two 4-bit counters. I am using two chips to give us a total of 16 bits. That is more than enough for us to use.

Setting up these counters is quite easy. The last bit of the first counter, QD (most significant bit), connects to the clock of the next, and this is repeated two more times to include all counters. The clock to the counter comes from a free-running clock. The LM555 is a versatile timer that can be used as a "one shot" or resettable timer, but I am using it as a free-running timer. That means that the output clocks high and low continuously, which is necessary in our case.

So, the output of the 555 is connected to the clock of the first counter. The clear (CLR) of the counters and the reset (R) of the 555 are connected together to an RC constant, which is just a capacitor that charges through a resistor. When you first turn the power on, the cap is discharged. Therefore, the

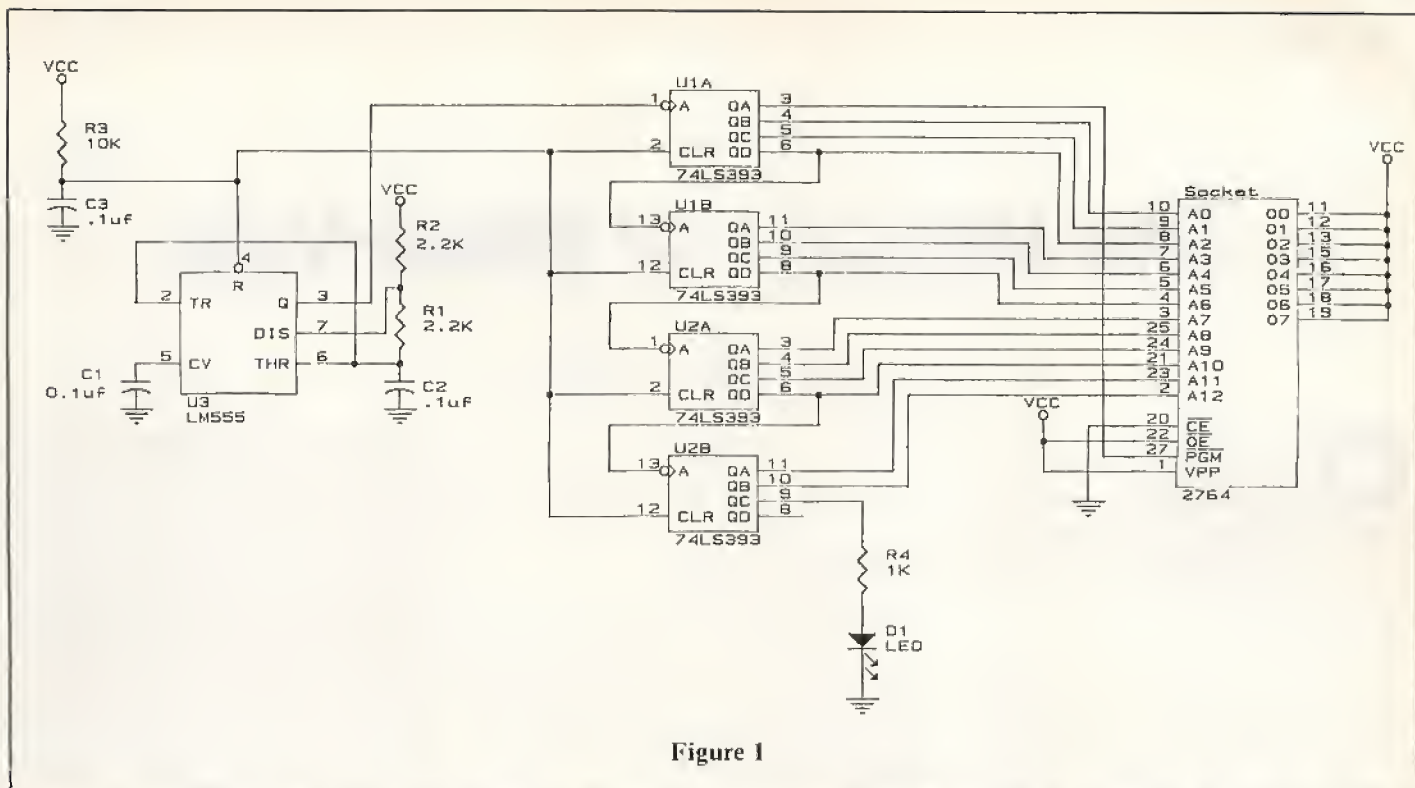


Figure 1

555 and the counter are held inactive. When the cap charges to 5 volts, it activates the 555 and counters. This is done in order to give the power supply time to stabilize and to make sure that all the chips are properly powered before starting. It also clears all the counters to zeros.

Once the power is stabilized and the reset releases, the 555 starts to clock. That starts the counters. If you notice, the first bit is connected to the PGM pin of our 2764 socket. That programs (or pulses) the data (\$FF) into each chip. The next 13 bits of the counter are connected to address lines. It should be clear to you by now that all address lines have to be used.

The next bit on our counters is connected to an LED and a resistor. Last month I covered the theory on LEDs, so everyone should be up on it. This LED is used as an indicator to tell you that the process is finished. If you let the process continue, the LED will go off again and then on again. This will not hurt the chip, but it is not necessary to do it twice — once is enough.

Constructing the project is not too hard. It is recommended that you use sockets for all the chips. Use a 28-pin, ZIF socket for the 2764. If your budget does not allow for one, use a good quality socket, at least. Some of the cheap sockets are good only for one or two insertions. Figure 1 shows all connections except power and ground.

The following is a power and ground connection list for this project:

Chip Number	Power (5v)	Ground
U1	14	7
U2	14	7
U3	8	1
2764	28	14

It would be a good idea to run a few tests before you plug the EPROM emulator into the eraser. Turn the power on and check with a digital probe or meter to see if the 555 is working and if all the address lines are clocking. You should also see if the LED lights up after a while. Check for the proper 5 volts and ground on the 2764 socket. That should be all there is to it.

Erasing an EPROM emulator is simple. With the power to the eraser

turned off, insert the EPROM emulator. Turn the power on until you see the LED go on. Then turn the power off and remove the EPROM emulator. And that's that. □

Part	Description
U1	74LS 293
U2	74LS 293
U3	LM 555
C1	.1uf 25 V
C2	.1uf 25 V
C3	.1uf 25 V
R1	2.2K ¼ W
R2	2.2K ¼ W
R3	10K ¼ W
R4	1K ¼ W
D1	Red LED

Parts List

One-Liner Contest Winner . . .

If there is not a mouse in your house, do not despair! "Micki the Quicki Mouse" is here to fill the void.

The listing: 70 PMODE4:PCLS:SCREEN1,1:FORX=1T
 030:CIRCLE(128,70),3*X/4:CIRCLE(
 107,41),3*X/6:CIRCLE(148,40),3*X
 /6:CIRCLE(128,130),5*X/4:NEXT:DR
 AW"BM154,70R20":DRAW"BM154,80R16
 ":DRAW"BM104,80L16":DRAW"BM104,7
 0L20":DRAW"BM160,149R6U6R8U8R10U
 10R10U20":LINE INPUT

Ronald E. McClintock, Falls Church, VA

(For this winning one-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)

A first look at Tandy's user-friendly interface
for OS-9 Level II

The Impact of Multi-Vue

By Cray Augsburg
Rainbow Technical Editor

Over the years we have seen quite a few changes in the Color Computer. Some changes have been superficial, while others were somewhat drastic design changes made in line with Tandy's commitment to provide a truly powerful machine at the lowest price possible.

The changes made in the software area have been obvious, as well. How many can remember not having Extended BASIC? What about Disk BASIC? Then, to top things off, Tandy licensed OS-9 Level I from Microware. Now, with the advent of the CoCo 3, we have OS-9 Level II. This operating system, complete with windows, has brought a power to the CoCo that few of us could have foreseen.

The problem with such power is that it often involves a great deal of complexity. Let's face it, OS-9 is no breeze to learn and understand! For some time now, we have needed a way to organize all of that power in order to utilize it to its fullest. The latest entry in the progression toward a powerful but easy-to-use system, *Multi-Vue*, provides us with that organizational ability.

Multi-Vue is an environment within an environment. Most people refer to programs of its nature as a "user interface," which is simply the method we use to interact with the computer. We have gone from toggle switches to keyboards, from joysticks to micc. But the computer presents information to us in much the same way it has throughout the personal computing era — via a video display. However, the format in which the data is displayed has changed. With pull-down menus and a "point-

and-click" interface, the machine becomes easier to understand and control. This is what *Multi-Vue* is all about.

Multi-Vue as a System

Multi-Vue utilizes the general structure of OS-9 along with the windows from Level II to provide an easy method of user interaction with the Color Computer. It is a system that keeps track of where you are and allows for a sensible organization of the data you want to use. And, by its design, it allows the user to alter or customize the system to suit his or her particular needs. Mark Siegel, Tandy product manager for Software Engineering, says, "*Multi-Vue* will let the user build his own custom *DeskMate* out of stand-alone applications."

Multi-Vue doesn't include a word processor or a spreadsheet, or anything else we consider an application. Rather, it provides an environment for us to easily set up and operate the applications we choose to purchase.

It accomplishes its chores through a series of system files. As you probably have surmised, each application is associated with its own icon on the screen. When you select a particular icon, *Multi-Vue* doesn't directly run the application. Instead, it checks what is called an Application Information File (AIF). This system file contains information about which program it is to run, what parameters to use, which palettes to use, what minimum size window the application will run in and some other control information. *Multi-Vue* then executes the requested application based on this AIF file. Each application is associated with its own icon and AIF file.

The user simply creates an AIF file and icon for any application he or she wants to introduce into the system. Also, the AIF file for any application can easily be edited. Simply double-click the mouse button on the appropriate icon.

Multi-Vue also utilizes an Environment File. This user-created file contains information about your particular system. It knows how many drives you have and what their capacities are, and contains information about the printer you are using. All of this system-specific information can be used by application programs. Assuming a given application is written for the *Multi-Vue* environment, it can query the Environment File all by itself and configure itself for your particular system.

Many new users have a hard time moving through OS-9's directory structure and understanding just how, why and when to use the `chx` and `chd` commands. *Multi-Vue* eliminates this by offering a point-and-click alternative. When you boot the system, you'll notice that the screen contains icons for the various files and directories within the root directory.

To move into a given directory, just click on its associated icon. Then the screen will show the icons for all files and subdirectories within your current directory. In this manner, you can move down the "tree" as far as you need to go. Simply click on a small box in the upper left-hand corner of the screen and you will move one "place" backward.

When I say, "you will move one place backward," I mean you will return to the point from which you entered your current position. If you are within an application, it closes and you will find yourself back on the graphics screen pointing to the icon for that application. If you are not within an application or command, clicking the box takes you one level higher in the directory structure. This makes movement through the system much easier for newcomers.

Originally, it was rumored that *Multi-Vue* would not be able to run on a 128K system. This is not the case. However, since *Multi-Vue* runs in a graphics shell (a shell running in a graphics window), the memory restrictions of a 128K system do impose on the

Cray Augsburg is RAINBOW's technical editor and has an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky. His username on Delphi is CRAY.

performance of the environment. For instance, whenever the user chooses to do anything, the function he or she selects replaces the graphics shell in memory. The user cannot press the CLEAR key to return to the graphics shell; the graphics window and shell "come back to life" as soon as the user closes the application.

Performance on a 512K system is much more appreciable. The user simply clicks on the appropriate icon and a box appears in the current window. This box will be the same size as the minimum window size dictated by the AIF file. To set the box at a particular location, simply click the button again. The user can move the mouse (or joystick) to enlarge the box if desired. When the user clicks the button again, the system builds the application in this box (window) and starts it according to the information contained in the AIF file. This allows for a very smooth-running, user-friendly environment.

In its standard configuration, *Multi-Vue* seemed fairly fast. It is easy to imagine the power of this system running at 6ms on 80-track drives. Or, better yet, how about running it on a hard drive? The power of the environment would be enhanced that much more due to the storage capacity and speed allowed by such setups.

Additional Features

Across the top of the *Multi-Vue* "home screen" are several pull-down menus. These menus offer selections that allow you to control the system setup. One selection allows you to switch between the 40- and 80-column modes (512K system only). Another lets you add temporary devices to the environment. Let's say you have a RAM disk partitioned in memory and want to be able to access it. All you have to do is tell *Multi-Vue* that it exists. When you do, another device image appears on the left side of the screen with all the preconfigured device images.

One of the more esoteric, but very useful, features of the *Multi-Vue* environment is the Tandy icon. In the upper-left portion of the screen you will see a Tandy icon (an object shaped like an hourglass). This icon controls a menu that offers several goodies, including a pop-up calculator, a clock complete with alarm, system utilities and a clipboard function. The clipboard function can be used with properly written applications to "import" and "export" text — you can transfer sections of text between documents.

The utilities include a port option and printer configuration section. The printer section is fairly self-explanatory. The port option "replaces" the Xmode and Tmode commands used in OS-9. This selection allows you to change the various settings used for the serial port and the terminal.

A final option from the Tandy menu is the shell selection. After making this selection, you find yourself in a new bordered window from which you may execute various OS-9 system commands. Simply press the CTRL-BREAK combination to exit the shell and return to *Multi-Vue*.

What does all this mean? Tandy has made a "standard" out of OS-9 in the CoCo Community by moving to full support of it. Now they have introduced a standard-setting environment for OS-9 Level II on the CoCo 3. In other words, we should see *Multi-Vue* become a common point between applications written by the users, Tandy and third-party software houses. These applications would be written first to take advantage of the flexibility of the environment. They would be allowed to "interrogate" the system by reading the Environment File and then know how to configure themselves. Some programmers may include AIF files for their applications, eliminating the need for the end user to create such a file.

We will also see third-party applications taking advantage of the pop-up features such as the calendar and calculator. Also, the ability to import and export text will be utilized. Finally, we may see commercial software that includes "install" programs. The programs will automatically build the AIF file, read the Environment File, configure the application accordingly and install it on the system disk.

The most important aspect of the introduction of *Multi-Vue* is that OS-9 now has a very user-friendly interface. OS-9 novices will be able to run OS-9 without having to face the system itself. This may lead to a better understanding of the system in the long run because they will have a better feel for the environment before having to delve into the "how." Also, those who are already comfortable with OS-9 will find *Multi-Vue* makes their work that much easier and more enjoyable.

We are certainly excited about *Multi-Vue* and feel you will be, too. It opens up possibilities many people never thought of and will fill a strong need within the CoCo OS-9 Community. ☺

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Five nifty utilities for programmers

Hackers Haven

Auto-Executing ML Programs

By Doug Masten

16K
Disk

If you have been using packaged, commercial software, you have probably noticed that some auto-execute without your having to enter EXEC. This feature helps make the program look more professional and also adds a small measure of copy protection.

My BASIC utility, *AutoExec* (shown in Listing 1), will add a boot program to the end of your ML program. Once you have installed the boot loader to your program, all you have to do is enter `LOADM "filename"` and it automatically executes for you. To install

the auto-boot feature, just run `AUTO-EXEC` and enter the full filename of the ML file you want to modify. Make sure a disk with that file is in Drive 0.

I advise you to always use a backup copy of your program when running this utility. *AutoExec* will work for most ML programs, but there will be some that won't work properly.

(Questions or comments about this program may be directed to the author at Route 4, Box 3, Macon, MO 63552. Please enclose an SASE when writing for a reply.)

Peeling Graphics

By Donald Sapello

32K ECB
EDTASM+

For a really wacky effect on your `PMODE 4,1` graphics, run the machine language program shown in Listing 2. *PeelPCLS* actually "peels" pictures from the screen. Try it on the test program *Sample* (Listing 3). To run the program, enter `LOADM "PEELPCLS"` and load or type in a BASIC program (*SAMPLE* or any other `PMODE 4` graphic). Type `PCLER 8` and press ENTER. Then enter EXEC to peel the picture.

Painless Revisions

By Richard Steinbrueck

16K
ECB

You are in the middle of a programming spree, have changed a few lines of a program and want to save the new version, but you don't want to erase the last version. So you rename the program and save it. Hours later, you have killed a few versions, renamed some others and now have a dozen revisions, each with a slightly different name. Several days later, you return to your programming to find you can't figure out which version is the most recent.

directory will be listed, as well as the number of free granules. You will be given the following menu:

```
<C>CONTINUE OR SAVE
<S>AME
<N>EXT
<V>ERSION ###?
```

If that scenario sounds familiar, *Save and Run* can help you get organized and eliminate those problems. *Save and Run* is a 10-line routine that can be placed at the very beginning of a program, so that every time the program is run, the programmer is given the chance to save the program in its latest form with the extension indicating the version. The program matches the filename and extension as found in the disk directory with the name found in Line 0 of your program.

For your first copy, type in Listing 4, *SAVE&RUN.001*, and save it to disk in ASCII by entering *SAVE "SAVE&RUN.001",A*. Then run the program four times (one time for each of its four menu options) to test for possible errors.

When you want to do some programming of your own, load *SAVE&RUN.001* and modify Line 0 by replacing *SAVE&RUN.001* with the filename and extension you have chosen for your new program. Note: The filename replacing *SAVE&RUN* must have exactly eight characters or the program will not run properly because the peek and poke addresses are set for an eight-character filename. You can make any other modifications without affecting the peeks and pokes as long as you make them after the remark apostrophe in Line 0. Another caution: Because of the *GOTO10* statement in Line 3, your program must have a Line 10 or you will get a ?UL Error in 10.

Each time you want to save your work, just run your program. The

(Questions or comments regarding this program may be directed to the author at 1109 Lakemont Drive, Valrico, FL 33594. Please enclose an SASE when writing for a reply.)

Sometimes it is helpful to save your programming in ASCII so that you can use a word processor for major editing. *SAVE&RUN* can easily be modified to make ASCII saves by adding ",A" to Line 9 so it reads "SAVE F\$,A". Unfortunately, an ASCII save will cause the program to stop after saving the program. To test run the program either type *RUN10* to skip over the *SAVE&RUN* routine or run and use the Continue option the second time.

Cassette users take heart. With two changes, *SAVE&RUN* will work for cassette, too. From Line 1 delete *CLS:DIR:PRINTFREE(0); "FREE GRANS:"* and in Line 9 change *SAVE* to *CSAVE*. After you make these changes, enter *CSAVE "SAVE&RUN.001",A*.

Putting On the Program Squeeze

By Jyri J. Virkki

16K
ECB

Do you need more space for your data, but your program takes almost all the available memory? Do you have programs that are just a little too large to fit on your system? Or maybe you like developing programs with lots of spaces so debugging is easier, but you feel bad about all the wasted memory? Or you hate to compromise either speed or beauty, writing code that is efficient but not so pretty or beautiful but memory-hungry?

You now can have the best of both worlds — write pretty code, debug it, and remove all unnecessary spaces from it when you are done — ending up with a very efficient running version.

Crush is a machine language utility that strips unneeded spaces from BASIC programs, without affecting spaces between quotation marks or after REMs.

Enter Listing 5 into your assembler and assemble it to produce CRUSH.BIN. Then you can just enter LOADM and EXEC. If you don't have an assembler, use Listing 6, which is a BASIC loader that will poke in the ML code.

Crush will run in any size system without trouble. The only incompatibility that might arise is the use of a Color BASIC subroutine located in Register D. You should enter EXEC &HBDCC to see if it works on your ROM (mine is, I.1). If the screen displays a zero then it does work on your ROM. If the result is different, you will have to make the following

changes: in the assembly listing, delete lines 860 to 900; in the BASIC loader, replace Line 30 with 30 DATA 1B, 1B, 1B; then change the 1937B in Line 60 to 1B850.

If you use the BASIC loader, it will ask you for a starting address. Press ENTER without entering any number if you want to use the default address, which is \$1DA. This is the location of the cassette I/O buffer, a very convenient place for short utilities since you can just type LOADM and EXEC without having to use CLEAR to reserve memory. The disadvantage of this is that you can't use cassette I/O. If you use disk exclusively, you can leave it there, but if you need to use your cassette, answer the prompt with another address to locate the program.

Each time the program removes a space it prints the line number from which it was removed (unless you had to remove the jump to \$BDCC) — this allows you to keep you entertained, other than a blank screen while the program crunches away. It may take quite a while to crush a long program with many spaces in it.

The reason *Crush* is slow is that each time it finds a space, it moves the rest of the program and pointers down by one byte, and then goes back to the beginning of the program and starts from there.

(Questions or comments may be directed to the author at Estacion Experimental, Rio Piedras, Puerto Rico 00928. Please enclose an SASE when writing for a reply.) ☐

Debugging with Wordfind

By Donald Sapello

16K ECB
EDTASM+

Have you ever tried to translate a program from one CoCo to another? If you have, you know how tedious it is to track down all occurrences of specific pokes and commands that would prevent the program's operation on the other machine. The program shown in Listing 7 can help.

Word Find is a machine language program that searches for any word or string of characters that is printed to the screen. To use the program, enter LOADM "WORDFIND" and then EXEC. Next, enter the word or string you want to find, then run or list a BASIC program; your program or listing will stop when the word is printed. Press any other key to continue, except BREAK or ENTER.

Listing 1: AUTOEXEC

```

10 **AUTOEXEC**
20 'ADDS BOOT LOADER TO
30 'END OF ML FILE
40 '
50 'BY DOUG MASTEN
60 '   ROUTE 4, BOX 3
70 '   MACON, MO 63552
80 DATA 0,0,3,1,&H82,&H7E
90 INPUT"FILENAME";F$
100 OPEN"D",#1,F$,1
110 FIELD #1,1 AS C$
120 R=1
130 GET#1,R
140 'TEST FOR EOF
150 IF ASC(C$)=&HFF THEN240
160 'GET LENGTH OF DATA BLOCK
170 GET#1,R+1
180 L=256*ASC(C$)
190 GET#1,R+2
200 L=L+ASC(C$)
210 R=R+L+5
220 GOTO130
230 'GET EXEC ADDRESS
240 GET#1,R+3
250 E1$=C$
260 GET#1,R+4
270 E2$=C$
280 'ADD BOOT LOADER TO ML FILE

290 RESTORE
300 P=0
310 READ C
320 LSET C$ = CHR$(C)
330 PUT#1,R+P
340 P=P+1
350 IF P<>6 THEN310
360 R=R+P
370 LSET C$=E1$
380 PUT#1,R
390 LSET C$=E2$
400 PUT#1,R+1
410 LSET C$=CHR$(&HFF)
420 PUT#1,R+2
430 LSET C$=CHR$(0)
440 PUT#1,R+3
450 LSET C$=CHR$(0)
460 PUT#1,R+4
470 LSET C$=E1$
480 PUT#1,R+5
490 LSET C$=E2$
500 PUT#1,R+6
510 CLOSE#1
520 PRINT
530 PRINT"BOOT PROGRAM INSTALLED"
540 END

```

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Listing 2: PEELPCLS

```

00100 *****
00110 *
00120 * PEELPCLS
00130 * BY
00140 * DONALD SAPELLO
00150 *
00160 *****
7D00 00170 ORG $7D00
7D00 DC BC 00180 START LDD $BC
7D02 C3 3000 00190 ADDD #3000
7D05 1093 19 00200 CMPD $19
7D08 22 34 00210 BHI RTS
7D0A 9E BC 00220 COPY LDX $BC
7D0C 31 89 1800 00230 LEAY $1800,X
7D10 10BF 7D3A 00240 STY CMPX+1
7D14 EC 81 00250 LOOP0 LDD ,X++
7D16 ED 89 17FE 00260 STD $17FE,X
7D1A BC 7D3A 00270 CMPX CMPX+1
7D1D 25 F5 00280 BLO LOOP0
7D1F 9E BC 00290 LDX $BC
7D21 BF 7CFD 00300 STX $7CFD
7D24 BE 7CFD 00310 LINCLR LDX $7CFD
7D27 86 10 00320 LDA #10
7D29 B7 7CFF 00330 STA $7CFF
7D2C CC 0000 00340 LDD #0
7D2F ED 81 00350 LLOOP0 STD ,X++
7D31 7A 7CFF 00360 DEC $7CFF
7D34 26 F9 00370 BNE LLOOP0
7D36 BF 7CFD 00380 STX $7CFD
7D39 8C FFFF 00390 CMPX CMPX
7D3C 25 01 00400 BLO LSKIP0
7D3E 39 00410 RTS RTS
7D3F 31 89 17E0 00420 LSKIP0 LEAY $17E0,X
7D43 86 10 00430 GETPUT LDA #10
7D45 B7 7CFF 00440 STA $7CFF
7D48 EC A1 00450 GLOOP0 LDD ,Y++
7D4A AA 89 1800 00460 ORA $1800,X
7D4E EA 89 1801 00470 ORB $1801,X
7D52 ED 81 00480 STD ,X++
7D54 BC 7D3A 00490 CMPX CMPX+1
7D57 24 CB 00500 BHS LINCLR
7D59 7A 7CFF 00510 DEC $7CFF
7D5C 26 EA 00520 BNE GLOOP0
7D5E 31 A8 C0 00530 LEAY -$40,Y
7D61 10BC 7D3A 00540 CMPY CMPX+1
7D65 24 DC 00550 BHS GETPUT
7D67 20 BB 00560 BRA LINCLR
7D00 7D00 00570 END START
00000 TOTAL ERRORS

```

Listing 3: SAMPLE

```

10 'SAMPLE PROGRAM FOR "PEELPCLS
"
20 PCLEAR 8
30 PMODE 4,1
40 PCLS
50 SCREEN1,1
60 FOR X = 1 TO 25
70 CIRCLE(RND(255),RND(191)),RND
(40)
80 NEXT X
90 EXEC
100 GOTO 60

```


Listing 4: SAVE&RUN

```

Ø F$="SAVE&RUN.BAS" 'Copyright 1
1986 by Richard Steinbrueck, All
Rights Reserved
1 CLS:DIR:PRINTFREE(Ø);"FREE GRA
NS":A=PEEK(25)*256+PEEK(26):B=PE
EK(A+17):C=PEEK(A+18):D=PEEK(A+1
9):PRINT"<C>ONTINUE OR SAVE <S>A
ME,<N>EXTOR <V>ERSION ###?"
2 A$=INKEY$:IFA$=""THEN2
3 E=INSTR("CSN",A$):ON E GOTO1Ø,
8,5:IFA$<>"V"THEN2ELSEINPUT"WHAT
VERSION (3 CHAR)";A$:IFLEN(A$)<
>3THEN1
4 B=ASC(LEFT$(A$,1)):C=ASC(MID$(

```

```

A$,2,1)):D=ASC(RIGHT$(A$,1)):GOT
Ø7
5 D=D+1:IF D=57 THEN C=C+1:D=48
6 IF C=57 THEN B=B+1:C=48
7 IF B=57 THEN B=48
8 POKE A+17,B:POKEA+18,C:POKEA+1
9,D
9 F$=LEFT$(F$,9)+CHR$(B)+CHR$(C)
+CHR$(D):SAVE F$:CLS
1Ø 'there is a GOTO 1Ø in line 3
of the program. Make sure you
have a line 1Ø in your program
to avoid getting an error
message of ?UL ERROR IN 1Ø

```

Listing 5: CRUSH

```

ØØØ1Ø *****
ØØØ2Ø *          CRUSH !          *
ØØØ3Ø *          VERSION 2.1      *
ØØØ4Ø *
ØØØ5Ø *          WRITTEN BY       *
ØØØ6Ø *          JYRI J. VIRKKI   *
ØØØ7Ø *          ESTACION EXPERIMENTAL *
ØØØ8Ø *          RIO PIEDRAS, PR ØØ928 *
ØØ12Ø *****
ØØ13Ø          ORG          $1DA

```

Ø1DA



Burke & Burke

P.O. Box 1283 Palatine, IL 60078-1283 (312) 397-2898

1988 -- The Year of the Hard Disk!

The CoCo XT hard disk interface from Burke & Burke lets you connect up to 2 low cost, PC compatible 5 - 120 Meg hard drives to your CoCo. You buy the Western Digital WD1002-WX1 or WD1002-27X (RLL) controller, a case and a drive from the PC dealer of your choice. Just plug them into the CoCo XT, and you have a 20 Meg OS9 hard disk system for under \$450!



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HYPER-I/O (64K, includes 50 page user manual and utilities) -- \$24.95.
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Here are two real time savers for OS9 users. WILD lets you use wild cards with OS9's commands. MV rapidly moves files, and even entire directories, from place to place on your hard or floppy disks. WILD & MV -- one disk, two great utilities, only \$19.95!

OS9: wild asm /d0/src/*.*rc o=/d1/abs/release/*.*abs
OS9: mv /d1/abs/release /d1/release

ILLINOIS RESIDENTS PLEASE ADD 7.0% SALES TAX. COD's add \$2.00. Shipping (within the USA) \$2.00 per CoCo XT; \$1.50 per disk or ROM. Please allow 2 weeks for delivery (overnight delivery also available for in-stock items). Telephone orders accepted.



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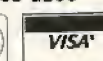
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SOFT-BYTE

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01DA		00140 *****
01DC		00150 COUNT RMB 2
01DE		00160 LINE RMB 2
01E0		00170 NEXT RMB 2
		00180 STATUS RMB 1
		00190 *****
01E1 86 01		00200 START LDA #1
01E3 A7 8C FA		00210 STA STATUS, PCR
01E6 6F 8C F1		00220 CLR COUNT, PCR
01E9 8D 14		00230 AGAIN BSR BEGIN
01EB 6D 8C F2		00240 TST STATUS, PCR
01EE 26 F9		00250 BNE AGAIN
01F0 DC 1F		00260 LDD \$1F
01F2 A3 8C E5		00270 SUBD COUNT, PCR
01F5 DD 1F		00280 STD \$1F
01F7 DC 1D		00290 LDD \$1D
01F9 A3 8C DE		00300 SUBD COUNT, PCR
01FC DD 1D		00310 STD \$1D
01FE 39		00320 RTS
		00330 *****
01FF 9E 19		00340 BEGIN LDX 25
0201 AF 8C D8		00350 STX LINE, PCR
		00360 *****
0204 AE 9C D5		00370 SEARCH LDX [LINE, PCR]
0207 8C 0000		00380 CMPX #0
020A 27 20		00390 BEQ ITSOVR
020C AF 8C CF		00400 STX NEXT, PCR
020F AE 8C CA		00410 LDX LINE, PCR
0212 30 04		00420 LEAX 4, X
0214 A6 80		00430 LOOPY LDA , X+
0216 81 20		00440 CMPA #32
0218 27 2A		00450 BEQ CRUNCH
021A 81 22		00460 CMPA #' "
021C 27 1A		00470 BEQ SKIP
021E 81 83		00480 CMPA #131
0220 27 0E		00490 BEQ NOTHR
0222 81 82		00500 CMPA #130
0224 27 0A		00510 BEQ NOTHR
0226 81 00		00520 CMPA #0
0228 27 06		00530 BEQ NOTHR
022A 20 E8		00540 BRA LOOPY
		00550 *****
		00560 * NO MORE SPACES LEFT *
		00570 *****
022C 6F 8C B1		00580 ITSOVR CLR STATUS, PCR
022F 39		00590 RTS
		00600 *****
		00610 * GO TO NEXT LINE *
		00620 *****
0230 AE 8C AB		00630 NOTHR LDX NEXT, PCR
0233 AF 8C A6		00640 STX LINE, PCR
0236 20 CC		00650 BRA SEARCH
		00660 *****
		00670 * DON'T REMOVE SPACES *
		00680 *BETWEEN QUOTATION MARKS*
		00690 *****
0238 A6 80		00700 SKIP LDA , X+
023A 81 22		00710 CMPA #' "

023C 27	D6	00720	BEQ	LOOPY
023E 81	00	00730	CMPA	#0
0240 27	EE	00740	BEQ	NOTHR
0242 20	F4	00750	BRA	SKIP
		00760	*****	
		00770	* MOVE PROGRAM DOWN BY *	
		00780	* ONE BYTE. *	
		00790	*****	
0244 1F	12	00800	CRUNCH	TFR X, Y
0246 31	3F	00810		LEAY -1, Y
0248 A6	80	00820	LOOPR	LDA ,X+
024A A7	A0	00830		STA ,Y+
024C 9C	1B	00840		CMPX 27
024E 25	F8	00850		BLO LOOPR
0250 AE	8C 89	00860		LDX LINE, PCR
0253 EC	02	00870		LDD 2, X
0255 BD	BDCC	00880		JSR \$BDCC
0258 86	20	00890		LDA #32
025A AD	9F A002	00900		JSR [\$A002]
		00910	*****	
		00920	*MOVE NEXT LINE POINTERS*	
		00930	* DOWN BY ONE BYTE. *	
		00940	*****	
025E AE	9D FF7A	00950	MORE	LDX [LINE, PCR]
0262 8C	0000	00960		CMPX #0
0265 27	0C	00970		BEQ NOMORE
0267 30	1F	00980		LEAX -1, X

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Clearbrook Software Group

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OS9 is a trademark of Microware Systems Corp., MSDos is a trademark of Microsoft Corp.

ERINA - Symbolic User Mode Debugger for OS9

ERINA is a must for all serious assembler and C software developers. It lets you find bugs quickly by displaying the machine state and instructions being executed. You can set address and register break points, dump, search and change memory, assemble and disassemble code and many other things to numerous to mention. This program will pay for itself over and over by the time you save solving your bugs.

Requires 80 column display, OS9 L1/2 \$69.00

SERINA - System Mode Debugger for OS9 L2

SERINA is a debugger for OS9 system modules (device drivers, file managers, etc.). It allows you to trace execution of any system module, set break points, assemble and disassemble code and examine and change memory. There are special provisions for executing code with critical timing loops and for accessing I/O registers. A must for system programmers.

Requires CoCo3, OS9 L2, \$139.00
 80 col. terminal connected to /T1 or /T2

MSF - MSDos File Manager for CoCo 3/OS9 Level 2

MSF is a file manager which allows you to use MSDos disks directly under OS9. You don't have to change the format of the data before using it!

Requires CoCo 3, OS9 L2, SDISK3 driver \$45.00

0269 AF	9D FF6F	00990	STX	[LINE,PCR]
026D AF	8D FF6B	01000	STX	LINE,PCR
0271 20	EB	01010	BRA	MORE
0273 9E	1B	01020	NOMORE LDX	27
0275 30	1F	01030	LEAX	-1,X
0277 9F	1B	01040	STX	27
0279 AE	8D FF5D	01050	LDX	COUNT,PCR
027D 30	01	01060	LEAX	1,X
027F AF	8D FF57	01070	STX	COUNT,PCR
0283 39		01080	RTS	
		01090	*****	
	01E1	01100	END	START

00000 TOTAL ERRORS

Listing 6: LOADER

0 DATA0,0,0,0,0,0,0,134,1,167,14	50 DATA93,48,1,175,141,255,87,57
0,250,111,140,241,141,20,109,140	,0
,242,38,249,220,31,163,140,229,2	52 CLS:PRINT" BASIC LOADER F
21,31,220,29,163,140,222,221,29,	OR CRUSH"
57,158,25,175,140,216,174,156,21	54 PRINT:PRINT:INPUT"STARTING AD
3,140,0,0,39,32,175,140,207,174	DRESS";SA:IFSA=0THENSA=474
10 DATA140,202,48,4,166,128,129,	56 EA=SA+170
32,39,42,129,34,39,26,129,131,39	58 FORR=SATOE:READA:POKER,A:C=C
,14,129,130,39,10,129,0,39,6,32,	+A:NEXT
232,111,140,177,57,174,140,171,1	60 IFC<>19378THENPRINT"*** DAT
75,140,166,32,204,166,128,129,34	A ERROR ***":STOP
,39,214,129,0,39,238,32,244,31,1	62 SA=SA+7:POKE157,INT(SA/256):P
8	OKE158,SA-INT(SA/256)*256
20 DATA49,63,166,128,167,160,156	64 PRINT:IFSA>3072THENPRINT"REME
,27,37,248,174,140,137,236,2	MBER TO CLEAR500,"SA-8:PRINT"BEF
30 DATA189,189,204	ORE LOADING CRUSH."
48 DATA134,32,173,159,160,2,174,	66 INPUT"SAVE TO <T>APE OR <D>IS
157,255,122,140,0,0,39,12,48,31,	K";A\$:IFA\$<>"T"ANDA\$<>"D"THEN66
175,157,255,111,175,141,255,107,	68 IFA\$="T"THENC\$AVEM"CRUSH",SA-
32,235,158,27,48,31,159,27,174,1	7,EA,SA:END
41,255	70 SAVEM"CRUSH",SA-7,EA,SA

Listing 7: WORDFIND

	00100 *****
	00110 * *
	00120 * WORDFIND *
	00130 * BY *
	00140 * DONALD SAPELLO *
	00150 * *
	00160 *****
	00170 * 32K VERSION *
	00180 * FOR 16K VERSION *
	00190 * MEMTOP EQU \$3FFF *
	00200 *****
7E00	7FFF 00210 MEMTOP EQU \$7FFF
7E00 CC 7E00	00220 ORG MEMTOP-\$1FF
7E03 DD 74	00230 START LDD #MEMTOP-\$1FF
7E05 DD 27	00240 STD \$74
	00250 STD \$27



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(See January '88 review)

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7E07	CC	00C8	00260	LDD	#200
7E0A	35	10	00270	PULS	X
7E0C	BF	7E13	00280	STX	LDX+1
7E0F	BD	AE46	00290	JSR	\$AE46
7E12	8E	FFFF	00300 LDX	LDX	#\$FFFF
7E15	34	10	00310	PSHS	X
7E17	8E	7F07	00320	LDX	#DATA
7E1A	7F	7FFE	00330	CLR	MEMTOP-1
7E1D	BD	7EA9	00340 LOOP1	JSR	LOOP5
7E20	7C	7FFE	00350	INC	MEMTOP-1
7E23	B6	0167	00360	LDA	\$167
7E26	81	39	00370	CMPA	#\$39
7E28	27	08	00380	BEQ	SKIP2
7E2A	BE	0168	00390	LDX	\$168
7E2D	8C	7E47	00400	CMPX	#MONITR
7E30	27	11	00410	BEQ	CLEAR1
7E32	BF	7E83	00420 SKIP2	STX	DB1
7E35	B7	7E82	00430	STA	RETURN
7E38	86	7E	00440	LDA	#\$7E
7E3A	8E	7E47	00450	LDX	#MONITR
7E3D	B7	0167	00460	STA	\$167
7E40	BF	0168	00470	STX	\$168
7E43	7F	7FFF	00480 CLEAR1	CLR	MEMTOP
7E46	39		00490	RTS	
7E47	34	02	00500 MONITR	PSHS	A
7E49	96	6F	00510	LDA	\$6F
7E4B	B1	7FFF	00520	CMPA	MEMTOP
7E4E	35	02	00530	PULS	A
7E50	26	30	00540	BNE	RETURN
7E52	7D	7FFE	00550	TST	MEMTOP-1
7E55	27	2B	00560	BEQ	RETURN
7E57	34	36	00570	PSHS	A,B,X,Y
7E59	7D	7FFD	00580	TST	MEMTOP-2
7E5C	26	0D	00590	BNE	MLOOP1
7E5E	8E	7F07	00600	LDX	#DATA
7E61	6D	84	00610	TST	,X
7E63	27	1B	00620	BEO	MRETRN
7E65	7C	7FFD	00630	INC	MEMTOP-2
7E68	BF	7E85	00640	STX	DB2
7E6B	BE	7E85	00650 MLOOP1	LDX	DB2
7E6E	A1	84	00660	CMPA	,X
7E70	27	05	00670	BEQ	MSKIP1
7E72	7F	7FFD	00680	CLR	MEMTOP-2
7E75	20	09	00690	BRA	MRETRN
7E77	30	01	00700 MSKIP1	LEAX	1,X
7E79	BF	7E85	00710	STX	DB2
7E7C	6D	84	00720	TST	,X
7E7E	27	07	00730	BEQ	INKEY
7E80	35	36	00740 MRETRN	PULS	A,B,X,Y
7E82	39		00750 RETURN	RTS	
7E83			00760 DB1	RMB	2
7E85			00770 DB2	RMB	2
7E87	7F	7FFD	00780 INKEY	CLR	MEMTOP-2
7E8A	7F	7FFE	00790	CLR	MEMTOP-1
7E8D	6F	E4	00800	CLR	,S
7E8F	AD	9F A002	00810	JSR	[\$A002]
7E93	7C	7FFE	00820	INC	MEMTOP-1
7E96	AD	9F A000	00830 ILOOP	JSR	[\$A000]

Computer Island Educational Software

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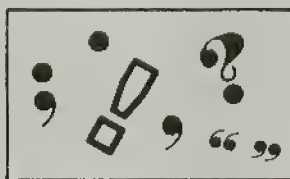


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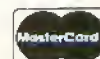
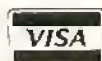


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7E9C	81	0D	00850	CMPA	#\$0D
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7EA0	81	03	00870	CMPA	#\$03
7EA2	26	DC	00880	BNE	MRETRN
7EA4	7F	7FFE	00890	CLR	MEMTOP-1
7EA7	20	D7	00900	BRA	MRETRN
7EA9	34	14	00910	PSHS	X, B
7EAB	8E	7F07	00920	LDX	#DATA
7EAE	AD	9F A000	00930	JSR	[\$A000]
7EB2	26	0E	00940	BNE	LOOP7
7EB4	B6	0113	00950	LDA	\$113
7EB7	48		00960	LSLA	
7EB8	84	20	00970	ANDA	#\$20
7EBA	8A	8F	00980	ORA	#\$8F
7EBC	A7	9F 0088	00990	STA	[\$88]
7EC0	20	EC	01000	BRA	LOOP6
7EC2	C6	60	01010	LDB	#\$60
7EC4	E7	9F 0088	01020	STB	[\$88]
7EC8	81	15	01030	CMPA	#\$15
7ECA	26	12	01040	BNE	SKIP
7ECC	8C	7F07	01050	CMPX	#DATA
7ECF	27	0D	01060	BEQ	SKIP
7ED1	86	08	01070	LDA	#\$8
7ED3	AD	9F A002	01080	JSR	[\$A002]
7ED7	30	1F	01090	LEAX	-1, X
7ED9	8C	7F07	01100	CMPX	#DATA
7EDC	26	F3	01110	BNE	FLUSH
7EDE	81	0D	01120	CMPA	#\$0D
7EE0	27	20	01130	BEQ	DONE
7EE2	81	08	01140	CMPA	#\$08
7EE4	27	0F	01150	BEQ	BACKSP
7EE6	81	03	01160	CMPA	#\$03
7EE8	27	C4	01170	BEQ	LOOP6
7EEA	A7	80	01180	STA	, X+
7EEC	8C	7FFB	01190	CMPX	#MEMTOP-4
7EEF	23	0B	01200	BLS	CHROUT
7EF1	30	1F	01210	LEAX	-1, X
7EF3	20	B9	01220	BRA	LOOP6
7EF5	8C	7F07	01230	CMPX	#DATA
7EF8	27	B4	01240	BEQ	LOOP6
7EFA	30	1F	01250	LEAX	-1, X
7EFC	AD	9F A002	01260	JSR	[\$A002]
7F00	20	AC	01270	BRA	LOOP6
7F02	6F	84	01280	CLR	, X
7F04	35	14	01290	PULS	B, X
7F06	39		01300	RTS	
7F07		00	01310	FCB	0
		7E00	01320	END	START

00000 TOTAL ERRORS

Telewriter-128™

the Color Computer 3 Word Processor

For over 5 years now, Telewriter has been the #1 Color Computer word processor, both in popularity and in performance. Telewriter's near perfect mix of sophisticated professional features and a very natural user interface, has earned it the highest praise in numerous magazines, and an intensely loyal following among tens of thousands of Color Computer users all over the world.

HISTORY

Throughout the history of the Color Computer, Telewriter has pioneered software breakthroughs that set the standards.

In 1981, it was Telewriter 1.0 that first took the Color Computer's inadequate 32X16 all-uppercase display, and replaced it with a graphics-based 51X24 upper and lowercase display.

A few years later, Telewriter-64 added high density 64X24 and 85X24 displays and access to the full 64K of the newer Color Computers.

THE NEW AGE

Today, Telewriter-64 is recognized as the standard Color Computer word processor. It runs on all Tandy Color Computers — from the original Color Computer 1, to the Color Computer 2, and 3.

But the Color Computer 3 brings a whole new level of power to low cost computing and, so, a new Telewriter is here to put that power to work for you. We call it Telewriter-128.

TELEWRITER-128

You don't mess with a good thing, so Telewriter-128 is still Telewriter-64 at heart. The commands, and the user interface are essentially the same. If you know Telewriter-64, then you already know Telewriter-128. And, if you don't know Telewriter-64, you'll still have an easy time learning and using Telewriter-128.

80 COLUMNS

But there are major differences as well. First, Telewriter-128 uses the Color Computer 3's new 80 column screen display.

This means, simply, that using Telewriter-128 on a low cost Color Computer 3 will look a lot like using a more expensive word processor on a much more expensive IBM PC, PS/2, or clone.

SPEED

Second, Telewriter-128 is lightning fast. Telewriter-64 was fast in its own right, but, by accessing the Color Computer 3's video hardware directly, and by running the machine in double speed mode, Telewriter-128 is able to provide extremely fast scrolling and instant paging — functions whose speed is crucial to serious word processing.

In this department, Telewriter-128 doesn't simply keep up with IBM-based word processors — it generally surpasses them!

EASE

Third, Telewriter-128 adds a host of new features big and small, that make it even easier to use.

Features like: Quick function key access to the editor or the menus — an instant on-line help screen summarizing all Telewriter commands and special characters — an option file where you store your personal set of format and screen settings so you only have to set them once!

Then, there's a quick save feature which allows you to save all your current work without leaving the editor. There's a simple way to cursor through the disk directory and read in a file by just hitting ENTER. And there's more.

NEW POWER

Telewriter-64 always had the power to handle any kind of serious writing, from letters to textbooks. But, here too, Telewriter-128 adds major features.

Like Macros — which let you insert whole words or phrases (even sets of control codes or format commands) into your text, with a single keypress. And every time you power up Telewriter-128, the macro definitions are automatically loaded*, so they're always there.

Then there's a Print Preview feature that shows you, on-screen, the way your printed text will look — with margins, headers, centering, justification, page numbering, and page breaks. This guarantees letter perfect documents every time, and makes tasks like widow/orphan line elimination, a breeze.

TELEWRITER-64 or TELEWRITER-128

We could go on listing features, but the point is this: If you own a Color Computer, you already have the hardware for the most powerful, low cost word processor in town. All you need now is to add the heart and soul:

Telewriter-64, for the Color Computer 1 and 2, costs \$59.95 on disk, \$49.95 on cassette.

Telewriter-128 for the Color Computer 3 costs \$79.95 on disk, \$69.95 on cassette.

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To upgrade from Telewriter-64 to Telewriter-128, return your original disk or cassette with \$39.95. (Add \$10 if you're also upgrading from cassette to disk. Deduct \$10 with proof of Oct '87 - Feb '88, purchase of Telewriter-64.)

When I first got Telewriter-64 last year, I was in heaven. I couldn't believe the program's versatility and ease of use.

-The RAINBOW, Oct. 1985

TELEWRITER-64 FEATURES: Compatibility with any printer that works with the Color Computer; embedded control codes for underlining, boldface, sub/superscript, variable fonts; format commands for headers, centering, margin and spacing changes anywhere in the document; Format menu to set margins, spacing, page numbering, BAUD rate, lines per page, justification; Chain printing for one shot printing of multi-file documents. Fast, full-screen editor with wordwrap, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, text alignment, tabs, error protection, word and line counter. Insert or delete text anywhere on the screen. Simple, easy to remember commands. Optional ASCII files for compatibility with spell checkers, terminal programs,

and BASIC. Load, save, append, partial save files to disk or cassette. Kill, rename and list disk files. Cassette verify and auto-retry on error.

TELEWRITER-128 - ADDITIONAL FEATURES: Print preview from editor; multiple copy print; footers: hanging indents; cursor thru disk directory to load, append, rename and kill files; quick file save from editor; keyclick; key repeat; true block move; 24, 25, or 28 line screen; 40 or 80 column screen; dual speed cursor; on-line help; overstrike mode; word delete; wordwrap at margin; user definable macros; nested macros; instant status window for information on cursor position, word count, etc.; instant function key access to menus or editor; options menu for setting character and screen colors, key repeat and delay rates, definable foreign symbols.

Disk Transfer

I I would like to run Radio Shack's Ernie's Magic Shapes, Cookie Monster's Letter Crunch and Grover's Number Rover from disk. However, these programs were written to run from cassette only, and conflict with address assignments for the DOS. They were also written in absolute reference code and are not readily relocatable. Is there a way to transfer the code?

John W. Hefler
Sausalito, CA

R I wrote a program called *TAPEx-FIX* that automatically modifies tape programs by appending a machine language loader. The program was published in the September 1983 issue of *HOT CoCo* in the article "Disk Utilities." For reprints, write CW Communications, 80 Pine St., Peterborough, NH.

Controlling Plug 'N Power

I I seem to remember reading in *RAINBOW* some instructions for controlling Radio Shack's Plug 'N Power Remote Control modules directly from BASIC. Could you tell me what issue this was in or where else I can find this information?

Fred Kaplan
Topeka, KS

R A.B. Trevor wrote four articles on the original Plug 'N Power (X10) system for the CoCo: "Let CoCo Control Your Home Power Units," February 1983; "CoCo Clock, An Accurate Timepiece," April 1983; "X10 Protocol Theory, Home Power Control," June 1983; and "Keep Your Home On Schedule," August 1983.

Richard Esposito is a senior project engineer with Northrop Corp. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.



By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Mitsubishi Drives on CoCo 2B

I I have a CoCo 2B with HDS controller and one MPI 51 drive, running BDOS. I recently got a great deal on two Mitsubishi 80-track drives (double-sided). They won't work at present. Will my controller handle these drives and, if so, is there a DOS available to run them? I have a friend who says that patched ADOS will work. Is this true, and how is the patch done?

James L. Pogue
Marietta, GA

R ADOS comes with a configuration program, and 80-track drives is one of the options.

Altering BASIC

I I have heard about the "all-RAM mode," which puts BASIC into RAM. How do you edit BASIC with the all-RAM program, to change BASIC commands, for example.

Daniel L. Miller
Oregon, OH

R On boot-up with the CoCo 3, or after running a ROM-to-RAM program on a 64K CoCo, you can either poke or use a machine language program to modify BASIC (addresses \$A000

through \$BFFF), Extended BASIC (\$8000 through \$9FFF) or Disk BASIC (\$C000 through \$DFFF).

CoCo and Commie Compatibility

I I was wondering if there is a way that the CoCo can run Commodore 64 software.

Alvin Malone
Diaz, AZ

R Only if the program is in BASIC and you transfer the ASCII code. It will also most likely require some modification since the two BASICs are not totally compatible.

Color Blind Software

I Is there a way to cause the correct color to come up in high resolution screens with software instead of by constantly pressing the reset button?

Richard Schultz
Carmichael, CA

R The four-plus color, 256-by-192 mode on the CoCo 1 and 2 machines is not officially supported in the 6847 SAM chip's documentation. The red/blue interchange on these machines cannot be controlled by software to automatically start the same way all the time.

OS-9 BBS Software

I I'm looking for information on where to get BBS software that runs under OS-9 for our CoCo club in York, Pennsylvania. Can you help?

Christian B. Lutz
York Haven, PA

R An OS-9 BBS program called *PBBS 5.0* is available for \$50 from Steve Roberson, (602) 884-7840. He recommends that the user have double-sided, 40-track drives at a minimum to use it. The source code is also available for an additional \$50.

Botched Communications

I I have tried and tried to communicate with my friend's OS-9 system using my modem, but each time I attempt to send underlines, boldface

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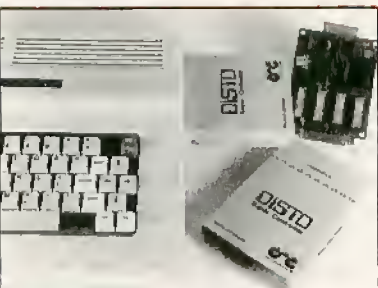


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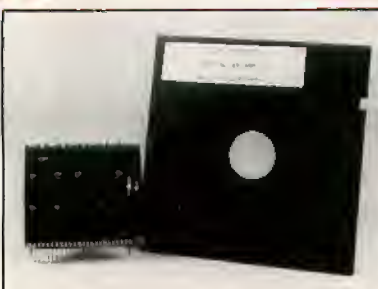
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Now is the time to upgrade your COCO 3 to 512K of memory. Available with or without memory chips, the Super Ram 3 board is easily installed inside the COCO. It is fully compatible with OS-9 Level 2 and is delivered with a software package (for BASIC) that includes: a printer spooler, a ramdisk, a memory test and an install/configure program for your system.

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characters, blinking characters, etc., all he gets is a homed cursor, and the rest of the special codes are ignored. Is this a bug or am I doing something wrong?

Tom Sanders
Parma, MI

R Thanks to Kevin Darling for coming up with a patch. Using *Mod-patch* -s, patch CC310:

c 778 a7 12
c 779 c8 12
c 77a 1f 12
c 79f 4b 4e
c 9ef c8 12
c 9f0 1f 12
c a2d bd c0
v

Then use *Save* to make a new module or *Cobbler* a new patched disk.

CoCo 3 Keys

I I just would like information on the CoCo 3 keyboard, specifically the F1, F2, CTRL and ALT keys. The CoCo manual doesn't cover them at all.

Kenneth Allen Leap
Norfolk, VA

R The ALT, CTRL, F1 and F2 keys occupy addresses 341, 342, 343 and 344 of the keyboard rollover table. When any one of these keys is pressed, the value at its corresponding address in the keyboard rollover table changes from 255 to 191. You can use this information in writing your own programs to detect when one of these keys are pressed.

Old Controller, New CoCo

I I have an old silver-case CoCo (F board — 1982) and a silver-case upright disk drive, which connects to the CoCo by means of a black controller. I would like to upgrade to a CoCo 3, but don't want the expense of a new disk drive and controller. Can I use my old disk drive and controller on a CoCo 3? Would a Multi-Pak interface solve my problem?

Charles Waldron
Fairfield, CT

R Your current controller, if it requires 12 volts, will not work with a CoCo 3 unless it somehow gets the required 12 volts (the use of a Multi-Pak is one way to supply the necessary 12 volts). OS-9 Level II runs at 2 MHz, which cannot be handled by most of the 12-volt controllers. If you plan to use OS-9 Level II, I'd suggest getting a new

controller. But, before you purchase either a Multi-Pak or a controller, check to see if you already have a 5-volt controller, for some of the earlier ones came with black housings.

Of Modem Paks and DeskMate 3

I Do you know of a way to use Radio Shack's Direct Connect Modem Pak (Cat. No. 26-2228) through the "Telecom" section of DeskMate 3 for the CoCo 3?

A.M. Fransen
Calgary, Alberta

R After you swap disks and select telecommunications, specify /M1 as your serial port.

64K Programs on 512K

I I'm thinking about selling my 64K CoCo and buying the CoCo 3 with the 512K upgrade kit. If I do, will I be able to run my 64K programs on it with no problems?

Michael Duvall
Zanesville, OH

R Yes and no. Many of your 64K programs will work without modification, some will work with minor fixes, and some may not be worth the time or trouble to fix. The two major areas of problems are those programs that interfere with the GIME chip and Super Extended BASIC. The former problem is usually with a 64K boot routine messing up the GIME (e.g., the VIP series programs have this problem); it is relatively easy to fix. The latter problem can be more difficult since code may have to be extensively modified.

The Power of the Pins

I The disk controller shipped with the original CoCo drives required a -5-volt supply from the CoCo to operate. The CoCo 2 does not have this source available on its cartridge connector. It is not possible to solve this problem using a Multi-Pak interface, since they are no longer available in Europe. Using some elementary electronic components, one can generate a -5-volt output coming from a 10-volt (or more) source. The only problem is the pin number on the cartridge connector. Would it be possible for you to inform me on this subject?

Dirk Vandekerckhove
B-8600 Menen, Belgium

R The power supplied at the ROM-pack port on the original CoCos was at 1) -12V(100MA), 2) +12V(300 MA), and 9) +5V(300MA). There was no external -5-volt supply.

Mac Hard Drives

I Can you make use of all the keys on the CoCo 3 keyboard on a CoCo 1 (F board)? If so, how complicated would it be? Could I hook up a Corvus 5 Mb hard drive, last used on a Macintosh, on my CoCo 1?

Rod Reinemer
Leaburg, OR

R The CoCo 3 keyboard is available from Radio Shack National Parts (Part No. AXX-0245). It should plug right in. With the proper interfacing hardware and software, you could use the drive. For starters, contact OwlWare and Burke & Burke, both advertisers in this magazine.

CoCo's British Brothers

I I am likely to move to England soon and would like to know if my CoCo would work there using a locally bought TV. I know that they use a 220-volt, 50Hz electrical system and a TV system called PAL instead of our NTSC. Is there a British computer similar to the CoCo? Would it run all the CoCo's programs?

Zafer Deeb
Toledo, OH

R There is a PAL version of the CoCo sold in Europe that is software-compatible with the NTSC versions sold here. Also, there is a CoCo clone called the Dragon sold there that will run some of the CoCo's software. See the recent article "CoCoing Abroad," in the November 1987 RAINBOW, Page 32, by Marty Goodman and Don Hutchison.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type ASK for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.



Barden's Buffer

An A'maze'ing Adventure

By William Barden, Jr.
Rainbow Contributing Editor

The Winchester Mystery House, found in Silicon Valley, California, started as a basic three-story Victorian home. Lucy Winchester, widow of the arms manufacturer, kept adding to it — as long as she kept building, she believed, she would never die.

There are stairways in the house that go nowhere, doors that open to sheer three-story drops, and doors that don't open at all. I was reminded of the house when writing this column — the maze game presented here is similar, and some of the problems I ran into while writing the program are analogous to those fake doors and empty rooms.

In this column I'll describe the maze game and its development and suggest ways you can add to it for your own version. You won't have to add much, though; by itself it's an interesting game, relying heavily on three-dimensional arrays and string processing, among other things.

The Scenario

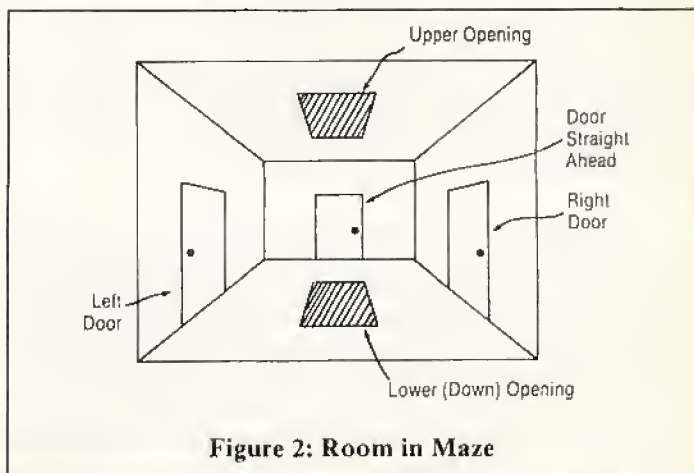
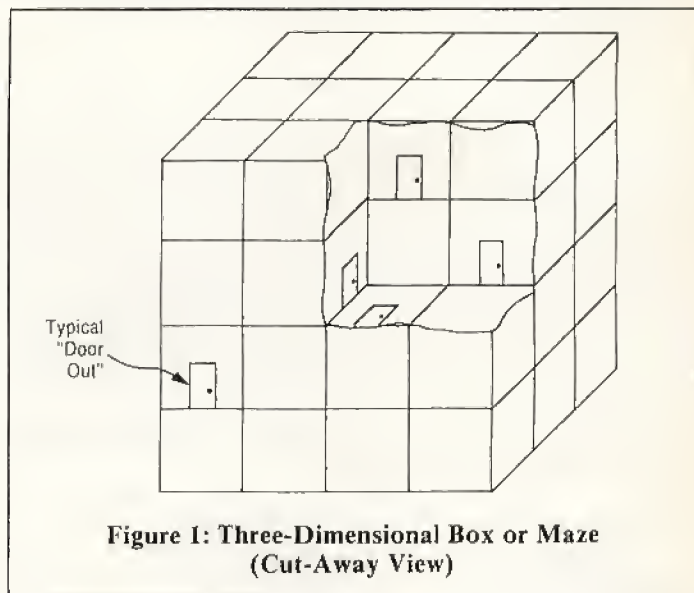
It's like this: Lucy Winchester has kidnapped you. Groggily, you awake (with a nasty headache) to find yourself in an interior room of the house. In order to find your way out, you'll have to negotiate the various rooms, floors and dead ends. (If you don't like that one, another scenario involves an abduction by aliens that look like clones of CoCo Cat — I'll leave it to you to establish your own fantasy.) In any event, you're in the middle of a three-dimensional box, as shown in Figure 1, and must find your way out to one of the four sides, the top or bottom.

Within the maze is a series of rooms. Each room can have a door on the left, a door on the right, a door in front of you, a door behind you, an opening in the ceiling to the floor above (no staircases here) or an opening in the floor to the floor below. Rooms may have any combination of these doors and openings — one room may have no doors, but another may have two doors and a ceiling opening. A room with every door and opening is presented in Figure 2.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

Game Play

By pressing keys you can move to adjacent rooms and go up or down one floor. When you go through a door, you may change directions. If you select the door to the right, for



example, you'll be facing the new room at a right angle to the old direction. Pressing these keys takes you from room to room:

- S through the door straight ahead
- B through the door behind you
- L through the door on your left
- R through the door on your right
- U through ceiling opening to floor above
- D through floor opening to floor below

Designing the Maze Game

Let's start off by assuming that the maze is a box, consisting of height, width and depth. We'll assume that the height must be greater than one story and the width and depth greater than two.

We could number each of the rooms, as shown in Figure 3, starting at the upper-left corner of the box and working down toward the lower-right corner. Numbering might work like the numbering of hotel rooms, which use the floor number as their first number — rooms 401 through 412 for rooms on Floor 4, for example.

This is a cumbersome way of identifying the rooms, however. Is Room 412 toward the front or back of the building? Is Room 401 on the left or right side? Another way to define the rooms is to use a *three-dimensional array*. An array is defined by the dimension statement (DIM) in Extended Color BASIC.

```
100 DIM R(2, 3, 4) 'height, width, depth
```

The DIM statement above defines a box that is two stories high, three rooms wide, and four rooms deep, numbered as shown in Figure 4. The box is called R. Actually, there's another floor, the "zero" floor, as well. The DIM statement allocates an array starting with 0 for all dimensions, so the height is 0 to 2, the width is 0 to 3, and the depth is 0 to 4, making the total number of rooms 3-by-4-by-5, or 60 rooms. However, in a lot of programs, the "zero" index is not used, because numbering often starts from 1 and not from 0. We'll do that here.

Variables can be used in place of numeric constants in the DIM statement, as in this example:

```
100 INPUT H 'get height
110 INPUT W 'get width
120 INPUT DP 'get depth
130 DIM R(H,W,DP) 'allocate array
```

Once the array has been defined, you can refer to any room in the array with its coordinates, or *indices*:

```
140 C=R(2,1,3)
```

The statement sets variable C equal to the room on the second story, the first row, and the third column. What is "in" R(2,1,3) is another problem, which we'll discuss shortly.

Instead of using stories, rows and columns, however, let's use the X/Y/Z scheme, shown in Figure 5. Here the height is equivalent to the Z dimension, the width is equivalent to the X dimension, and the depth is equivalent to the Y dimension. A room is defined by R(height,width,depth) or R(Z,X,Y).

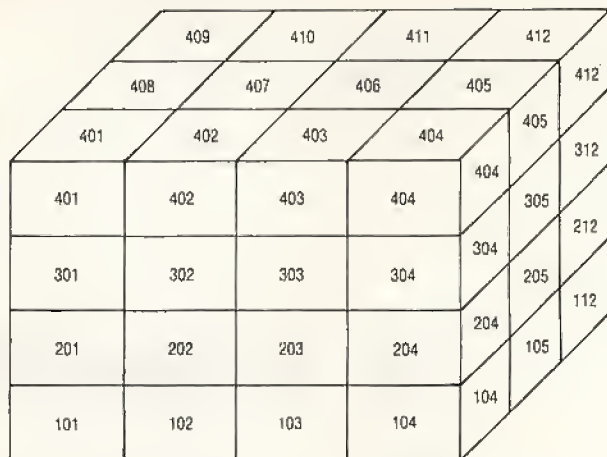


Figure 3: Hotel Room Numbering Scheme

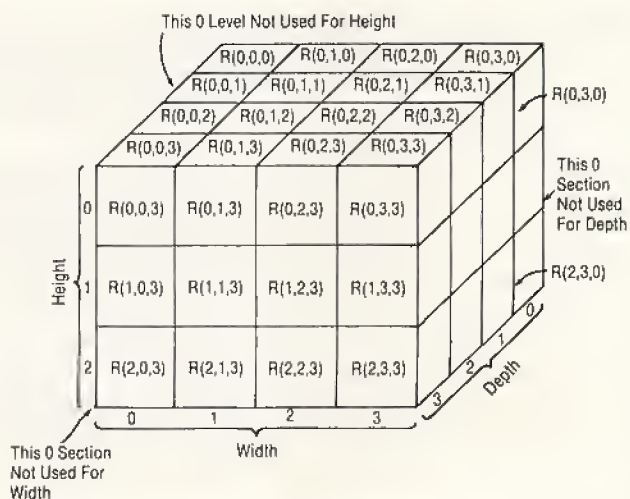


Figure 4: DIM Numbering

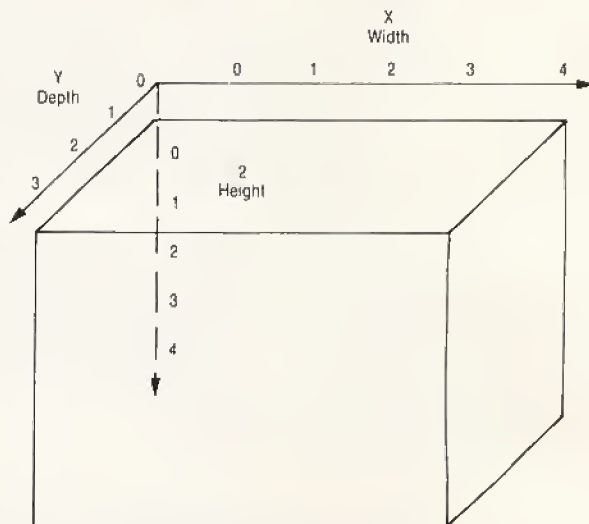


Figure 5: X/Y/Z Scheme



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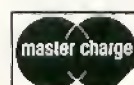
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Table 1: Decimal, Hexadecimal and Binary Values

0	&H00 000000	16	&H10 010000	32	&H20 100000	48	&H30 110000
1	&H01 000001	17	&H11 010001	33	&H21 100001	49	&H31 110001
2	&H02 000010	18	&H12 010010	34	&H22 100010	50	&H32 110010
3	&H03 000011	19	&H13 010011	35	&H23 100011	51	&H33 110011
4	&H04 000100	20	&H14 010100	36	&H24 100100	52	&H34 110100
5	&H05 000101	21	&H15 010101	37	&H25 100101	53	&H35 110101
6	&H06 000110	22	&H16 010110	38	&H26 100110	54	&H36 110110
7	&H07 000111	23	&H17 010111	39	&H27 100111	55	&H37 110111
8	&H08 001000	24	&H18 011000	40	&H28 101001	56	&H38 111000
9	&H09 001001	25	&H19 011001	41	&H29 101001	57	&H39 111001
10	&H0A 001010	26	&H1A 011010	42	&H2A 101010	58	&H3A 111010
11	&H0B 001011	27	&H1B 011011	43	&H2B 101011	59	&H3B 111011
12	&H0C 001100	28	&H1C 011100	44	&H2C 101100	60	&H3C 111100
13	&H0D 001101	29	&H1D 011101	45	&H2D 101101	61	&H3D 111101
14	&H0E 001110	30	&H1E 011110	46	&H2E 101110	62	&H3E 111110
15	&H0F 001111	31	&H1F 011111	47	&H2F 101111	63	&H3F 111111

What's in a Room

What *is* in a room? We know that the array R is a numeric array and each room or element contains a numeric value. How does that numeric value represent the doors and openings of the room? One way is to use a string array and then form a string of words to define what the room looks like. The string could be "left door, right door, ceiling opening", for example. To be more concise, we could say "LRU" for "Left door, Right door, and Upper opening".

Another way of representing the room, though, is with *bits* — binary digits. We know that there are only six possible doors and openings in a room (right door, left door, the door in front, the door behind, the ceiling opening, and the floor opening). These six doors and openings can be represented in six bits, as shown in Figure 6. A bit with a value of 1 indicates that the door or opening is present, while a 0 bit indicates that the door or opening is not there.

The six bits always have the same meaning as shown in the figure. They occupy the same position in the value. A value of 100101, for example, means U (upper), L(left), and R(right).

To calculate the decimal value for each bit, just add 32, 16, 8, 4, 2, or 1 together, depending on which bit is present. In the example of 100101, you'd have 32+4+1=37 decimal. For this room, then, the value that represents an upper opening, left door and right door could be set by this line:

```
200 R(2,1,2) = 37
```

The 2,1,2 indices for Z, X and Y (height, width and depth) are just three arbitrary values we happened to choose.)

The value used for a room could range from 0 (no doors or openings) to 63 (all doors and ceiling and floor openings). Another way of specifying this value is in *hexadecimal* or *Hex*, which is a shorthand way of representing binary. In this case, decimal values of 0 through 63 are represented by Hex values of 0 through &H3F, as shown in Table 1.

The numbers in the first column of the table are the decimal numbers; the numbers in the second column, with the &H prefix, are the hexadecimal equivalents; and the numbers in the last are the binary equivalents.

Drawing the Rooms

At this point we have a three-dimensional box or array, with each element of the array containing a value from 0 to 63 that indicates the doors and openings. To draw any room from the room value, we first check each bit of the value and then draw the appropriate door or opening. But before that, we have to draw the outline of the room, since that stays constant for any room. The BASIC code for drawing a room is found in lines 220 through 470 of Listing 1, but here is a condensed presentation of those lines to provide a clearer understanding:

```

100 SCREEN 1,0           'graphics screen
110 PMODE 4              '256 x 192
120 COLOR 2,3           'black on green
130 PCLS                 'clear screen
140 LINE(0,0)-(255,191),PSET,B 'border
150 C=R(Z,X,Y)           'value, 0 to 63
160 GOSUB 710            'outline
170 IF (C AND 32) 0 THEN GOSUB 1110 'upper
180 IF (C AND 16) 0 THEN GOSUB 1030 'lower
190 IF (C AND 4) 0 THEN GOSUB 790  'left door
210 IF (C AND 2) 0 THEN GOSUB 950  'front door
220 IF (C AND 1) 0 THEN GOSUB 870  'right door

```

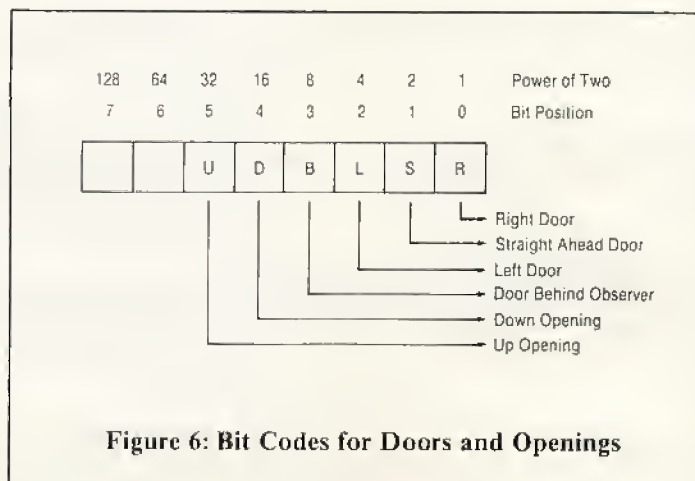


Figure 6: Bit Codes for Doors and Openings

Calligrapher New Fonts

Sugar Software's popular CoCo Calligrapher program now has a new set of 5 fonts. The text of this ad was printed with the OS9 Calligrapher and the condensed ROMAN font.

Like all of the current 54 fonts, these are variable width for a more pleasing appearance. The new fonts are the smallest of all (less than .2 inches tall) and are more useful for Desktop Publishing:

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□□□□□

These five new fonts are available in either RSDOS or OS9 format. The introductory price for the set on disk or tape (RSDOS) is \$18.50, good through March 31st. The font set requires that you have the CoCo or OS9 Calligrapher (\$24.95).

The Calligrapher Programs - Both the OS9 and CoCo Calligrapher come with three 1/2-inch fonts: Old English, Gay Nineties and Cartoon. Both come with support for Epson, Gemini, Radio Shack, Okidata 92A, Banana and Prowriter printers. Both print the same fonts.

CoCo Calligrapher - Tape or Disk; \$24.95. OS9 Calligrapher - Requires OS9 Level I or II; Disk only; \$24.95.

This ad was composed using 1/2-inch Reversed Old English for the headline, 1/4-inch Block for headers and .2-inch Roman for the body. A 2 1/4-inch column was printed and cut to three columns. Specify OS9 or CoCo (RSDOS) when ordering Calligrapher or fonts.

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The Information Management System, TIMS, is a very easy-to-use database program. TIMS is used to create files of things. You decide what you want to file; it could be articles, collections (coins, stamps, video tapes, etc.), anything you might put into an index card file. The advantage to computerizing your files is that you can quickly search the entire file in a fraction of a second; sort the file on any of the fields (up to 3) in a few seconds; easily update your fields or records; and print your file, or a portion of it in a format you design.

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TIMS UTILITY

The TIMS Utility program enhances the other programs. It allows multi-term searches of your files, global modification and deletion of records and file splitting.

TIMS COMBO

Your best value is to purchase the entire TIMS library on a single disk. All three programs are included along with a sample TIMS bibliography file of all articles written about the CoCo in 1981 and 1982!

All the TIMS programs run on either tape or disk. The tape TIMS programs may be moved to disk when you do.

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All programs run on the CoCo 1, 2 and 3, 32K Extended Basic, unless otherwise noted. Add \$1.50 per tape or disk for postage and handling. Florida residents add 6% sales tax. COD orders add \$4. Dealer inquiries invited. Orders generally shipped in 24-48 hours. No refunds or exchanges without prior authorization.

The subroutine at Line 710 of Listing 1 draws the room outline as if you were looking into the room from the doorway you've just passed through. The other subroutines draw individual doors or the ceiling and floor openings. The room outline is always drawn, but the other subroutines are called only if the proper bit is set in the value. The bit for each is tested by ANDing the room value with the value of 32, 16, 4, 2, or 1. The AND returns a non-zero result if the bit is set and a zero result if the bit is not set. The door "behind" the observer is not drawn, because it is not visible in the view of the room. It's still always there, however, because it's one of the ways to get into the room.

The code for drawing the doors and openings uses a series of LINE statements. A CIRCLE statement in the door subroutines draws a doorknob, and PAINT colors the doorknob black. Ceiling and floor openings are painted black, as well. The code for drawing the shapes is shown in lines 700 through 1700 of Listing 1.

Moving From Room to Room

The code in lines 700 through 1700 draws a single room, but what about moving through the maze? One way to move through the maze is to use a single key press to go either up, down, back, left, straight ahead or right; keys U, D, B, L, S and R are used to move in those directions. An INKEY\$ command allows you to read in a key, as shown in lines 480 through 500 of Listing 1:

```
480 A$=INKEY$: IF A$="" THEN GOTO 480
490 A=INSTR("UDBSLRH",A$)
500 IF A=0 THEN GOTO 480
```

The code loops at Line 480 until a key is pressed. The INSTR statement then looks at the string UDBLSRH to find the key letter in A\$. If the letter is found, variable A is set to the position in the UDBLSRH string of 1 through 7. If the letter is not found, A is set to 0 and the key press is ignored.

There's a big problem, though, in moving from room to room. The values in the elements of each array are based on an observer facing "north" — right really means east, left is west, and so forth. However, when you're moving through the rooms, you're turning right or left to go through the right or left doors, or turning completely around to return through the door you just entered. (In going through the door in front of you, you keep the same direction, as you do when going up or down.) When you turn and walk through the door, you may be facing another direction. If the room were drawn from the original data, the view would always be the one you see facing north and not the one you see walking through the door (see Figure 7).

The answer to this problem is a conversion of the original room doors and openings to those corresponding to the observer's view. To do this, a *direction* variable has to be maintained. Let's use variable D to represent the direction. Again, we could have used N, E, S and W in a string variable, but our choice was:

```
0 = North
1 = East
2 = South
3 = West
```

The conversion is common sense. If an observer enters a room and faces north, the right and left sense of the original room values apply. However, if an observer enters a room

facing east, the door straight ahead is actually the "right" door of the original value; the door to the right is actually the "back" door of the original value, and so forth. Facing south and west requires the same type of conversion. Here's a conversion table:

```
C$="20154130540235431254"
```

This "table" requires some explanation. It's divided into four parts for north, east, south and west:

20154	13054	02354	31254
N	E	S	W

The single digit represents the bit that should be tested for the door or opening — Bit 5 (most significant) through Bit 0 (least significant). The order of the string is LRSUD, for left, right, straight, up or down. Facing north, for example, Bit 2 should be tested for the left door. Facing south, however, Bit 0 should be tested for the left door, as the original right door is now viewed as the left door. Confused? It *is* confusing and there's probably no way to simplify it unless you sit down and draw some sample cases yourself.

Using the C\$ "table," the direction variable D and the code for the movement key (U, D, B, L, S, or R), it's easy to go through the conversion to draw the room as it appears to an observer in the doorway. Lines 360 through 390 of Listing 1 do this:

```
360 C=R(Z,X,Y)
370 GOSUB 710
380 M=INT(2^VAL(MID$,C$(D*5)+1,1))
390 IF (C AND M) <> 0 THEN GOSUB 790
```

This code accomplishes the same thing as the previous code — it draws the left door of the room, but it first converts what the observer sees as the left door to the original door. The MID\$ portion of the statement gets the bit position; the

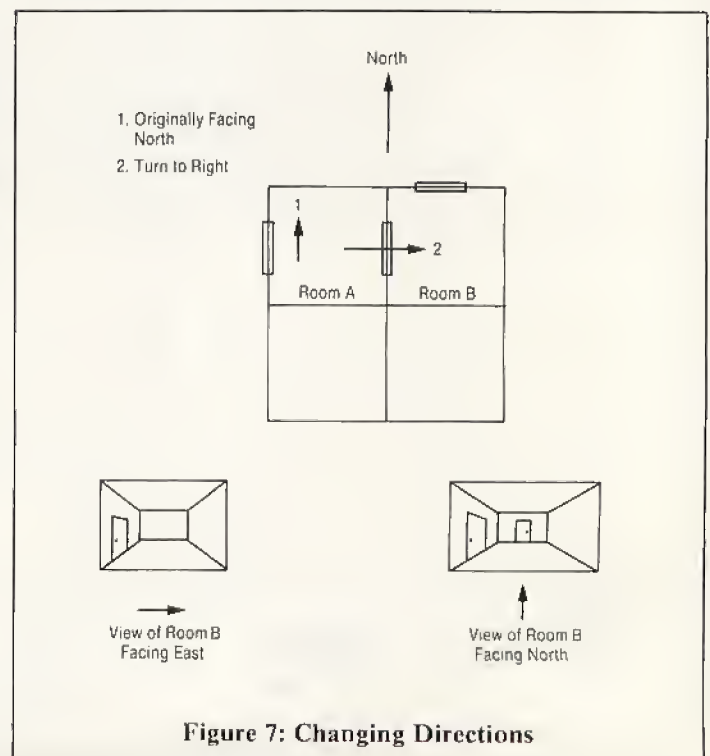


Figure 7: Changing Directions

VAL portion converts the single character to a numeric value; the 2^ portion changes this numeric value to a power of 2 (32, 16, 8, 4, 2, or 1); and the INT portion makes certain that the power of 2 is an integer value. The result is put into variable M, a "mask" variable with a value of 32, 16, 8, 4, 2, or 1. The modified code for drawing the room is found in lines 310 through 500 of Listing 1.

Once the room is drawn, the player can input a key to determine which direction he wants to go — U, D, B, L, S or R. One problem with this, however, is that the player can input a direction that isn't allowed. He may try to go through a left door where there *isn't* a door (on the left), for example. This cannot be allowed. To prevent it, a check must be made of allowable directions based on the current direction, the intended direction and the openings that are present. The code in lines 480 through 590 accomplishes the conversion.

The value C in Line 590 is the value of the current room in the array. Variable A is a mask value of 32, 16, 8, 4, 2 or 1 derived from the "543 . . . 321" string by the current direction D (1, 1, 2 or 3) and the A code. If the AND of X and A is zero, there is no corresponding bit in the array value and the key is ignored. If the AND is non-zero, then the direction the player wants to move is valid.

If the player has entered a valid direction, the next step is to change the current direction in the variable D. This is done by adding 1 for a move to the right, adding 2 for a move backward, or subtracting 1 for a move to the left. Moving up or down does not alter the direction. The second thing done is adjusting Z, X or Y to reflect the move. Moving up subtracts 1 from the current Z value, and moving down adds 1 to it. If the direction is north (D=0), 1 is subtracted from Y. If the direction is east (D=1), 1 is added to X. If the direction is south (D=2), 1 is added to Y. If the direction is west (D=3), 1 is subtracted from X.

A check is then made of the current Z, X, Y. If any of the three variables is equal to 0, the player has moved out of the "box" and the game is over. If any of the three variables is equal to a value one greater than the dimension limit height, width or depth, the player has moved out of the box, as well. If the player is still within the box, the process repeats. The code for these actions is shown in Listing 1, along with the code described above.

How to Generate a Maze

The above discussion assumes that a maze exists. But who created it? Not me — you'll have to create your own.

One way to create a maze is to sit down with paper and pencil and draw one out, adding a random number of doors and openings in each room. A better way, and the way I opted for, was to have the CoCo generate a three-dimensional maze!

The resulting FINDMAZE program shown in Listing 2 uses the same structure we've been discussing above, an array of three dimensions with a height (Z) greater than 1, a width (X) greater than 2, and a depth (Y) greater than 2. The first portion of code defines an array R of dimensions height, width and depth.

The next portion of code fills all of the "rooms" of the array with a random arrangement of doors and openings. Since this value is from 0 to 63, an RND(64) - 1 expression produces the proper random value.

The rooms are now filled with random doors and openings. However, there's a slight problem. Because adjacent rooms — rooms next to each other — are created randomly, there may be a door that leads into an adjoining room, but no door

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going back into the original room. Imagine this scenario: The player presses R for right to go through a door. Upon entering the room he sees no doors or openings (a random value of 0). Thinking he'll go back the way he came, he presses B, which should return him to the previous room, but facing the opposite direction. Instead, he can't get back because there is no door!

To solve this problem, a scan is made of all rooms. If there is a door to the right but no door to the left in the adjoining room, one is added. Conversely, if there is a door to the left but no door to the right in the preceding room, one is added. The same actions are taken for "up" and "down" openings and for doors that are straight ahead and behind.

Next, the center room is found by setting Z, X and Y equal to the integer value of the dimension divided by 2. Variable N is then set to 0, for north.

The coding at the heart of FINDMAZE does a "random walk" through the maze. Starting at the center, a direction N is chosen at random, including an up/down direction. However, if the direction represents a return back to a room it was in previously, the direction is discarded and a new direction found (travel through the maze doesn't reverse itself).

Variables TZ, TX and TY are set equal to Z, X and Y. These variables represent a "trial room." Based on the current direction of travel (N), Z, X or Y is adjusted for the direction. The adjustment defines a new room. A check is made of all the old rooms (stored in Array S) to make certain that the path does not come back to a previous room. If it does, a new direction is taken and the trial room discarded.

If the trial room represents a room that is out of the maze (Z, X or Y = 0, or Z, X or Y = dimension+1), the trial room is also discarded, providing that less than 30 percent of the rooms have been used in the path of travel.

If the trial room is OK, then a doorway or opening is "blasted through." Of course, one might exist without having to set a new one, but an OR of the proper bit sets one, regardless.

There's a problem with blasting a new doorway similar to that of the generation of random rooms, however. If no doorway or opening exists on the other side, the player will not be able to reverse himself in going through the maze path. The corresponding door or opening on the new room is therefore blasted through as well by a second OR.

If the outside of the maze is not reached, the process is repeated — the program wends through the maze in erratic fashion, blasting a path through random rooms until the outside is reached. Each time a new room is computed, it is added to the "previous rooms" Array S, so that a check may be made of trial rooms. Also, a record of the direction taken is recorded in string A\$. At the end of the random walk, A\$ holds the sequence to follow to get out of the maze, such as "DLLSSULSRULDDSS".

At the end of the FINDMAZE program the complete room array is saved to a disk file, along with the array dimensions and path sequence. This disk file is read into the NEWMAZE program to "initialize" the maze.

Using FINDMAZE and NEWMAZE

To play a game, first run FINDMAZE to define a maze. A good height, width and depth to try is 5-by-5-by-5 — about 38 rooms will be present in the maze path. You'll see the room coordinates displayed on the screen as they are calculated. The program will then ask you for a disk filename for the maze data, after which the maze data will be written out. Any filename will do.

Next, run NEWMAZE and reply with the filename just created. The program loads the maze file and displays the center room. Use the U, D, B, L, S and R keys to move through the maze. Any direction that is not possible will be ignored. If you're stuck, use the H key to list the directions to travel — it displays the A\$ string from FINDMAZE.

There are about 3,800,000,000,000 combinations for a 5-by-5-by-5 maze, so the game is not easy. You might try making a map as you travel through the maze!

FINDMAZE and NEWMAZE are "core" programs that do the job, but there is room for embellishments. How about a way

of marking a wall with a paint that remains visible, but only for 10 moves? What about a monster pursuing you through the maze, with a heartbeat sound that gets more frequent, louder and higher-pitched as it approaches?

Another thing that could be added is a "vanish button" that transports you to another room if the monster appears to be too close — maybe a "button" with a battery that takes 20 moves to recharge? How about adding some of those "trap" rooms that have no way out? Some rooms might open out onto sheer drops, just like the Winchester House. The possibilities are endless. □

390	.....	111	970	.....	111
550	.....	20	END	.....	122
710	.....	111			

Listing 1: NEWMAZE

```

100 'EXECUTE A MAZE GAME
110 '
120 'READ MAZE FILE
130 INPUT "MAZE FILE NAME:";MF$
140 OPEN "I",#1,MF$
150 INPUT#1,H,W,DP
160 DIM R(H,W,DP)
170 FOR Z=1 TO H:FOR X=1 TO W:FO
R Y=1 TO DP
180 INPUT#1,R(Z,X,Y)
190 NEXT:NEXT:NEXT
200 INPUT#1,B$
210 '
220 'INITIALIZE
230 SCREEN 1,0
240 PMODE 4
250 COLOR 2,3
260 PCLS
270 Y=INT(DP/2)
280 X=INT(W/2)
290 Z=INT(H/2)
300 D=0
310 C$="20154130540235431254"
320 '
330 'MAIN LOOP - DO UNTIL OUT
340 PCLS
350 LINE(0,0)-(255,191),PSET,B
360 C=R(Z,X,Y)
370 GOSUB 710
380 M=INT(2^VAL(MID$(C$,(D*5)+1,
1)))
390 IF (C AND M) <> 0 THEN GOSU
B 790
400 M=INT(2^VAL(MID$(C$,(D*5)+2,
1)))
410 IF (C AND M) <> 0 THEN GOSU
B 870
420 M=INT(2^VAL(MID$(C$,(D*5)+3,
1)))
430 IF (C AND M) <> 0 THEN GOSU
B 950
440 M=INT(2^VAL(MID$(C$,(D*5)+4,

```

```

1)))
450 IF (C AND M) <> 0 THEN GOSU
B 1110
460 M=INT(2^VAL(MID$(C$,(D*5)+5,
1)))
470 IF (C AND M) <> 0 THEN GOSU
B 1030
480 A$=INKEY$: IF A$="" THEN GOT
O 480
490 A=INSTR("UDBLSRH",A$)
500 IF A=0 THEN GOTO 480
510 IF A$<>"H" THEN GOTO 580
520 SCREEN 0,0
530 PRINT "THE SEQUENCE IS:"; B$
540 PRINT "PRESS ANY KEY TO CONT
INUE"
550 A$=INKEY$: IF A$="" THEN GOT
O 550
560 SCREEN 1,0
570 GOTO 480
580 A=INT(2^(VAL(MID$("543210542
103541032540321", (D*6)+A,1))))
590 IF (C AND A) = 0 THEN GOTO
480
600 IF A$="U" THEN Z=Z-1 ELSE IF
A$="D" THEN Z=Z+1
610 IF A$="R" THEN D=D+1: IF D=4
THEN D=0
620 IF A$="B" THEN D=D+2: IF D>3
THEN D=D-4
630 IF A$="L" THEN D=D-1: IF D=-
1 THEN D=3
640 IF (A$="U") OR (A$="D") THEN
GOTO 660
650 IF D=0 THEN Y=Y-1 ELSE IF D=
1 THEN X=X+1 ELSE IF D=2 THEN Y=
Y+1 ELSE X=X-1
660 IF NOT((X=0) OR (X=W+1) OR (
Y=0) OR (Y=DP+1) OR (Z=0) OR (Z=
H+1)) THEN GOTO 690
670 PRINT "YOU'RE OUT! HIT ANY K
EY TO PLAY ANOTHER"
680 A$=INKEY$: IF A$="" THEN GOT
O 680 ELSE GOTO 230
690 GOTO 340
700 '
710 'DRAW ROOM OUTLINE
720 LINE (80,60)-(176,132),PSET,
B

```

```

730 LINE (0,0)-(80,60),PSET
740 LINE (0,191)-(80,132),PSET
750 LINE (255,0)-(176,60),PSET
760 LINE (255,191)-(176,132),PSE
T
770 RETURN
780 '
790 'DRAW LEFT DOOR
800 LINE (26,172)-(26,70),PSET
810 LINE (52,152)-(52,78),PSET
820 LINE (26,70)-(52,78),PSET
830 CIRCLE (34,121),3
840 PAINT (34,121),0
850 RETURN
860 '
870 'DRAW RIGHT DOOR
880 LINE (203,152)-(203,78),PSET
890 LINE (229,172)-(229,70),PSET
900 LINE (203,78)-(229,70),PSET
910 CIRCLE (222,121),3
920 PAINT (222,121),0
930 RETURN
940 '
950 'DRAW DOOR STRAIGHT AHEAD
960 LINE (112,132)-(112,84),PSET

```

```

970 LINE (144,132)-(144,84),PSET
980 LINE (112,84)-(144,84),PSET
990 CIRCLE (138,110),.3
1000 PAINT (138,110),0
1010 RETURN
1020 '
1030 'DRAW LOWER OPENING
1040 LINE(100,172)-(156,172),PSE
T
1050 LINE (109,152)-(147,152),PS
ET
1060 LINE (100,172)-(109,152),PS
ET
1070 LINE (156,172)-(147,152),PS
ET
1080 PAINT(128,162),0
1090 RETURN
1100 '
1110 'DRAW UPPER OPENING
1120 LINE(100,24)-(156,24),PSET
1130 LINE(109,44)-(147,44),PSET
1140 LINE(100,24)-(109,44),PSET
1150 LINE(147,44)-(156,24),PSET
1160 PAINT (128,34),0
1170 RETURN

```

✓	330 .....12
	460 .....157
	670 .....234
	END .....105

Listing 2: FINDMAZE

```

100 'CONSTRUCT A 3-D MAZE
110 '
120 D$="SRBLDULSRBDUBLSRDURBLSDU
"
130 DIM S(200)
140 '
150 'INPUT DIMENSIONS, GET ARRAY
160 INPUT "HEIGHT:";H
170 IF H<2 THEN GOTO 160
180 INPUT "WIDTH:";W
190 IF W<3 THEN GOTO 180
200 INPUT "DEPTH:";DP
210 IF DP<3 THEN GOTO 200
220 DIM R(H,W,DP)
230 '
240 'FILL ROOMS WITH RANDOM DOOR
S
250 FOR Z=1 TO H:FOR X=1 TO W:FO
R Y=1 TO DP
260 R(Z,X,Y)=RND(64)-1
270 IF Y=1 THEN R(Z,X,Y)=R(Z,X,Y
) AND &H3D
280 IF Y=DP THEN R(Z,X,Y)=R(Z,X,
Y) AND &H37
290 IF X=1 THEN R(Z,X,Y)=R(Z,X,Y
) AND &H3B
300 IF X=W THEN R(Z,X,Y)=R(Z,X,Y
) AND &H3E

```

```

310 IF Z=1 THEN R(Z,X,Y)=R(Z,X,Y
) AND &H1F
320 IF Z=H THEN R(Z,X,Y)=R(Z,X,Y
) AND &H2F
330 NEXT:NEXT:NEXT
340 FOR Z=1 TO H: FOR X=1 TO W:
FOR Y=1 TO DP
350 IF Z=1 THEN GOTO 360 ELSE IF
(R(Z-1,X,Y) AND 16) <> 0 THEN R
(Z,X,Y) = R(Z,X,Y) OR 32
360 IF X=1 THEN GOTO 370 ELSE IF
(R(Z,X-1,Y) AND 1) <> 0 THEN R(
Z,X,Y) = R(Z,X,Y) OR 4
370 IF Y=1 THEN GOTO 380 ELSE IF
(R(Z,X,Y-1) AND 8) <> 0 THEN R(
Z,X,Y) = R(Z,X,Y) OR 2
380 IF Z=H THEN GOTO 390 ELSE IF
(R(Z+1,X,Y) AND 32) <> 0 THEN R
(Z,X,Y) = R(Z,X,Y) OR 16
390 IF X=W THEN GOTO 400 ELSE IF
(R(Z,X+1,Y) AND 4) <> 0 THEN R(
Z,X,Y) = R(Z,X,Y) OR 1
400 IF Y=DP THEN GOTO 410 ELSE I
F (R(Z,X,Y+1) AND 2) <> 0 THEN R
(Z,X,Y) = R(Z,X,Y) OR 8
410 NEXT:NEXT:NEXT
420 '
430 'FIND CENTER ROOM
440 F=0
450 D=0
460 Y=INT(DP/2)
470 X=INT(W/2)
480 Z=INT(H/2)
490 S(1)=Z: S(2)=X: S(3)=Y: JE=3
500 PRINT Z;X;Y

```



```

510 A$=""
520 '
530 'MAIN LOOP
540 'DO A RANDOM WALK
550 N=RND(6)-1
560 IF F=0 THEN F=1: GOTO 640
570 IF (N=2 AND D=0) OR (N=0 AND
D=2) OR (N=1 AND D=3) OR (N=3 A
ND D=1) THEN GOTO 550
580 TZ=Z: TX=X: TY=Y
590 IF N=5 THEN TZ=TZ-1 ELSE IF
N=4 THEN TZ=TZ+1 ELSE IF N=3 THE
N TX=TX-1 ELSE IF N=2 THEN TY=TY
+1 ELSE IF N=1 THEN TX=TX+1 ELSE
TY=TY-1
600 FOR J=1 TO JE STEP 3
610 IF (TZ=S(J)) AND (TX=S(J+1))
AND (TY=S(J+2)) THEN GOTO 550
620 NEXT J
630 IF (TX=0) OR (TX=W+1) OR (TY
=0) OR (TY=DP+1) OR (TZ=0) OR (T
Z=H+1) THEN IF JE<(H*W*DP)/3 THE
N GOTO 550
640 IF N=0 THEN M=2 ELSE IF N=1
THEN M=1 ELSE IF N=2 THEN M=8 EL
SE IF N=3 THEN M=4 ELSE M=2^N
650 R(Z,X,Y)=R(Z,X,Y) OR M
660 IF M=32 THEN M=16 ELSE IF M=
16 THEN M=32 ELSE IF M=8 THEN M=

```

```

2 ELSE IF M=2 THEN M=8 ELSE IF M
=4 THEN M=1 ELSE IF M=1 THEN M=4
670 A$=A$+MID$(D$,D*6+(N+1),1)
680 IF N=5 THEN Z=Z-1 ELSE IF N=
4 THEN Z=Z+1
690 IF N=3 THEN X=X-1 ELSE IF N=
2 THEN Y=Y+1 ELSE IF N=1 THEN X=
X+1 ELSE IF N=0 THEN Y=Y-1
700 S(JE+1)=Z: S(JE+2)=X: S(JE+3
)=Y: JE=JE+3
710 IF NOT((Z=H+1) OR (Y=DP+1) O
R (X=W+1)) THEN R(Z,X,Y)=R(Z,X,Y
) OR M
720 IF N<4 THEN D=N
730 PRINT Z;X;Y
740 IF (Z=0) OR (Z=H+1) OR (Y=0)
OR (Y=DP+1) OR (X=0) OR (X=W+1)
THEN GOTO 770 ELSE GOTO 550
750 '
760 'STORE MAZE IN MAZE FILE
770 INPUT"MAZE FILE NAME:";MF$
780 OPEN "O",#1,MF$
790 PRINT#1,H,W,DP
800 FOR Z=1 TO H: FOR X=1 TO W:
FOR Y=1 TO DP
810 PRINT#1,R(Z,X,Y)
820 NEXT: NEXT: NEXT
830 PRINT#1,A$
840 CLOSE

```

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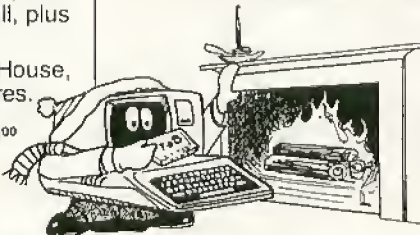
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KISSable OS-9

Using a Fourth-Generation Database Language

By Dale L. Puckett
Rainbow Contributing Editor

I saw the future at RAINBOWfest Princeton. Unfortunately, I still haven't had a chance to attack *Multi-View* with my own mouse and keyboard — but it looked very nice under the command of Mark Siegel, Tandy's software product manager. It may be just what we need to get more people on the OS-9 team.

This month we'll take a look at *Sculptor*, a fourth-generation database application. We will also spotlight the first user contribution to *KISSDraw*, our CoCo community OS-9 programming project. But first we'll share a few tips from readers and look at the new enhanced CoCoBin standard proposed by *Wiz* author Bill Brady.

We received a helpful hint from Jay Truesdale on RAINBOW's Delphi OS-9 Online SIG, who writes:

"I ran across this gem in the OS-9/68000 manual at work, so I ran home and tried it with OS-9/6809. It worked beautifully. There is a reference to this technique on Page 3-9 of the OS-9 Level II manual, but it is vague and obscure. If you are pretty far down in a directory tree and want to change to another working directory temporarily, try this.

Instead of typing two long paths to change your working data directory with `chd`, try this line:

```
OS9: (chd /newworkingdirpath)
```

"This OS-9 command line creates a new shell, which uses `newworkingdirpath` as its current data directory.

"To return to your previous directory, press CTRL-ESC on the Color Computer 3. This action will kill the new shell and return you to the shell using your original working directory."

Good research! Neat trick! Thanks, Jay! Another helpful hint for beginners was contributed by Brian Wright — POLTERGEIST on Delphi. "If you know someone who wants to get started with OS-9 Level I or Level II, list the file named `Helpmsg` in the `SYS` directory to your printer and give the person the hard copy. This file pretty much describes the command syntax for all OS-9 utility commands. Also, if your friends want to know more about device descriptors and drivers and other things OS-9, have them take a look at the files in the `HELP` directory on their Level II Config disk." Another good tip! Thanks, Brian!

New CoCoBin Standard

Bill Brady, author of the OS-9 terminal program *Wiz*, has upgraded his proposed CoCoBin standard to handle ICONs and AIFs — application information files — supported by *Multi-View* and the new *WindInt* manager. We print it here with the hope that its automatic operation will make it easier for everyone to receive and enjoy the many

public domain OS-9 fonts, picture files, etc., bound to follow. Brady proposed that a binary protocol be created and that it be defined as follows:

One or more blocks would be sent as a preface to binary — Xmodem — transfers. These blocks shall contain information for the purpose of transferring the FD information, the ICON and the AIF, and for removing the fill at the end of the file transmission. On uploading, the operator will be given a choice of Upload or CoCoBin upload. If CoCoBin is selected, the sending software will preface the actual file data with block(s) that contain the information shown in Figure 1.

All undefined bytes in the block should be set to `$C9`. All sizes are equal to the number of bytes in the data item. ICON = 144 bytes.

It is the intent of this standard to apply, and be usable with, transfer methodologies other than Xmodem — hence the use of offsets. Offsets are relative to the first data byte, not (Xmodem) blocks. It is also the intent of this standard not to preclude compression-decompression "on the fly."

After this block is sent, data transfer will continue in the customary fashion, with the next block labeled as Block 2. If ICON data is present, ICON data may or may not start at Block 2. AIF data can start at any point after the ICON, so the ICON will usually be transferred first, AIF next, starting at the beginning of Block 2.

After all ICON and AIF data is sent, it is recommended that data begin on the next block boundary for Xmodem. However, it may begin at any point.

Dale L. Puckett, who is author of The Official BASIC09 Tour Guide and co-author, with Peter Dibble, of The Complete Rainbow Guide to OS-9, is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale is a U.S. Coast Guard lieutenant and lives in Rockville, Maryland.

This method, although requiring previous knowledge on the operator's part for uploading, is transparent to the host computer.

On downloading, the receiver may know in advance that the file is in the CoCoBin format, or the software may detect the transfer as CoCoBin as shown in Figure 2.

The receiving Xmodem will then decode the file size (which is the most useful piece of information) and use it in the following ways:

a) display to the operator the number of blocks forthcoming in the transmission

b) use the total blocks/received blocks to drive a % complete indicator

c) discontinue writing data to the incoming file when bytes received equals the filesize (FD.SIZ), effectively "stripping the fill"

The software will place the ICON and AIF data in the appropriate directory on the appropriate volume. At this time the author is unsure as to the exact use of ICON and AIF data. If the execute bit is set, the data portion of the file may be placed in the current execution directory.

After this use, the receiving Xmodem shall discard the CoCoBin block — Block #1 — the ICON and AIF data, and save all subsequent blocks/data to the file.

The opportunity exists for other information to be included in the not yet defined bytes of this block. Responses to this proposed enhancement of the Xmodem transfer methodology should be addressed to William L. Brady, 1503-I Flanders Lane, Harwood MD 29776, CIS 70126,267, Delphi WBRADY, GENIE W.BRADY, or 301-952-1761.

This CoCoBin revision will be used in future releases of *Wiz* — *gWiz* — and various public domain packages released by the author.

Wood Adds Color to *KISSDraw*

Tom Wood at 1973 Fairgrounds Road, Burton, SC 29902, is the first one out of the gate with an addition to *KISSDraw*, our OS-9 shareware programming project. The BASIC09 procedure *KISSColor* listed this month does the work. Wood modified several other *KISSDraw4* procedures to add color. We'll outline his changes here.

Wood beat us to a project we have wanted to do for a long time. He has definitely inspired me to add code that determines if you are running *KISS-*

XMODEM 132 byte Block #1 CoCoBin			OS9 FD Definition
Offset			
-3	Xmodem byte 1	SOH (01)	
-2	Xmodem byte 2	Block # (01)	
-1	Xmodem byte 3	Block MOD(256)	
0	Xmodem byte 4	ATTR byte (usually (07))	FD.ATT
1	Xmodem byte 5	OWNER msb (usually (00))	FD.OWN
2	Xmodem byte 6	OWNER lsb (usually (00))	
3	Xmodem byte 7	YEAR (87)(\$57) Date	FD.DAT
4	Xmodem byte 8	MONTH (03) Last Modified	
5	Xmodem byte 9	DAY	
6	Xmodem byte 10	Hours	
7	Xmodem byte 11	Minutes	
8	Xmodem byte 12	FILE SIZE mmsb	FD.SIZ
9	Xmodem byte 13	FILE SIZE msb	
10	Xmodem byte 14	FILE SIZE lsb	
11	Xmodem byte 15	FILE SIZE llsb	
12	Xmodem byte 16	CoCoBin Revision Xmodem byte MUST be \$FE	
13	Xmodem byte 17	Size of filename	
14	Xmodem byte 18-49	File Name (ASCII) Not Pathname or \$C9	
46	Xmodem byte 50	Offset to ICON data (Normally 129 in xmodem... 2nd block)	
47	Xmodem byte 51	ICON size	
48	Xmodem byte 52-53	Offset to AIF data	
50	Xmodem byte 54 -55	AIF size	
52	Xmodem byte 56-57	Offset to Start of file data.	
54	Xmodem byte 58-62	reserved for compression flags \$00000=not a compressed file	
59	Xmodem byte 63-130	NOT YET DEFINED (\$C9), reserved for expansion of CoCoBin.	
127	Xmodem byte 131	CoCoBin Revision byte MOD(256)	
128	Xmodem byte 132	Checksum	

Figure 1

```

0  Xmodem byte 4 (attr) must not be 0
8  Xmodem bytes 12,13,14,15 must not sum to 0
12 Xmodem byte 16 must be $FF or $FE (revision byte) FE=this edition
127 Xmodem byte 131 must be MOD(256) of Xmodem byte 16

```

Figure 2

Draw in a four- or 16-color window and reacts accordingly. You could really draw some nice pictures with Wood's addition installed in a copy of *KISS-Draw* running in a 16-color window. I'll try to make that my next project.

You change *KISSDraw*'s current drawing color by clicking on the color you want in a bar of 16 equally spaced boxes along the bottom of the screen. When you are running in a four-color window — as in all versions of *KISS-Draw* to date — only four of the boxes will be colored. A larger box on the left end of the bar always displays the current drawing color.

You can change the current drawing color to any of the 64 hues available on the Color Computer by pointing to the large box, holding down the mouse button and dragging the mouse from left to right. When you release the button, the color value remains at the currently displayed hue.

To use the *KISSColor* procedure, you must modify several of the *KISS-Draw* procedures and add a color variable to the type stats in all *KISSDraw*

procedures. Changes (Figure 9) required are summarized here:

KISSdMenu — add routine to draw colored boxes

GetKISSMouse — add check to see if *ButtonEvent.Mouse.AcX*>180 and set *InToolBox* to TRUE if so

WhichTool — add check to see if *mouse.AcX*>180 and set *status.color* to TRUE if so

DoEvent — add RUN *KISSColor* (*ButtonEvent*)

KISSDraw4 — add code to set *ButtonEvent.Pointer.Coulor* to 1 and the statement *Run GFX2("color", 1)* so the program always starts with color Number 1

KISSColor simply checks *AcX* sequentially from left to right and either changes the current palette value or the current foreground color. *ButtonEvent.Pointer.Coulor* always contains the current drawing color.

"It really looks like *KISSDraw* is headed directly for animation creation," Wood said. "With multitasking

and a little sound thrown in, we should be able to beat the other computers to it at this rate — with your object oriented art and some timed sequences and SS.Tone — it's all there."

Thanks for the KISSColor procedure, Tom! Who's next?

FHL and Sculptor team help OS-9 Users Group

Color Computer OS-9 users stand to benefit greatly from a change in procedures made by Dave Kaleita, the new president of the OS-9 Users Group. Frank Hogg at FHL is now distributing the 56 disks in the group's software library directly.

You no longer need to be a member of the group to buy a disk of programs. And you should now get your disks in a few days, instead of the few months it once took, because your order no longer needs to be sent through the group's notoriously slow mail relay system. The group benefits, too, because FHL pays a royalty fee for each disk mailed.

When a massive undertaking like the OS-9 Users Group Software Library moves from a volunteer effort to a commercial enterprise, many potential problems surface. For example, prospective buyers expect to be told which programs they can find on a disk — and they want an answer now!

On the surface, this doesn't sound like much of a problem. But when you consider the OS-9 Users Group software library features more than 340 programs squeezed onto 56 disks, you begin to get a clear picture of the problem. Even though the group's librarian has divided the programs into categories, it is difficult to keep track of 340+ programs — in both source and binary versions — and all the files that hold the documentation.

In the Users Group's early years, Dave Kaleita kept the information in an RMS database. He then used OS-9's redirection capability to send the output of his RMS report program to a text file. After that, the file was updated using *DynaStar* — an OS-9 word processor.

The information was all available, but it was stored in a format that was almost impossible to search quickly. To solve the problem, Hogg converted the *DynaStar* text file to a *Sculptor* database that could easily be manipulated and maintained. He also added key-word searching so his telephone operators could quickly find the programs his customers wanted.

```
Title: REMOTE      From: SEATON, WM. GLENN
Ver: 1    Lang: ASM.6809  Fmt: SOURCE
Function: "LINKS" USER TO A SPECIFIED REMOTE TERMINAL PATH FOR
COMMUNICATION.
Program Type: COMMUNICATION
Planned for volume #    0  Already used? Y
```

Figure 3

```
REMOTE
SEATON, WM. GLENN
1
ASM.6809
SOURCE
"LINKS" USER TO A SPECIFIED REMOTE TERMINAL PATH FOR COMMUNICATION
-done-
COMMUNICATION
0
Y
-end-
```

Figure 4

For each field enter:
name,heading,type&size,format;validation
Type h for help.

Field name must be unique using A-Z a-z 0-9 -- only.
Valid field types are:

```
a = alphanumeric(maximum 255 bytes)
i = integer(size 1, 2 or 4 bytes)
r = real(size 8 bytes)
m = money(size 4 or 8 bytes)
d = date(size 4 bytes)
```

Single byte integers are always positive. Data fields may be dimensioned.
Both format and validation list are optional. The validation list may contain both single values and ranges of values. Examples:

```
item,Item Code,a12
Unit,,a5;each,gross,doz,box[Heading defaults to name]
description,,a20[No heading]
stklev,Stock Level,i4,#####
price,Sale Price,m4(3),####.##
cat,Category,i1,##;1-10,50,90-99
```

Figure 5

Since we have long wanted to introduce you to the power of today's new fourth-generation databases like *Sculptor*, we asked Hogg to show us how easy it would be to accomplish a rather complex task — managing the OS-9 Users Group software library, for example.

Converting a Database

An example of a record in the original *DynaStar* file is given in Figure 3. Further study of the file reveals that the records contain from one to three lines under Function. It also shows the maximum length of each field in a record.

Hogg's first step was to use the *Umacs* text editor — available from the Users Group Library — to delete words like "Title:" and "From:" from each field. This editor's extensive macro capabilities made the job easy.

Hogg put each field on an individual line and added the line "-done-" before the "Program Type:" field. He also added the line "-end-" between records

and added a last line, "-fin-", so he could test for the end of the file. He named the new file *convRecord*. A record in *convRecord* looks like that shown in Figure 4.

After Hogg finished processing the raw *DynaStar* text file with *Umacs*, he had to describe his new data file for *Sculptor*. He used the *Sculptor* describe utility to do this job. He named the file containing the description, *disk*. Figure 5 is a snapshot of the help screen displayed by *describe*. To see this screen while running *describe*, you must press H.

Here is how Hogg described the OS-9 Users Group software library file:

```
KEY FIELDS
1:u_title,Title,a20,u

DATA FIELDS
2:u_size,# Sectors,a4,;0-9999
3:u_from,From,a30,u
4:u_ver,Version,a12,u
5:u_language,Language,a16,1
6:u_format,Format,a16,1
7:u_function,Function,a73(3),1
8:u_type,Program Type,a24,1
9:u_volume,Volume #,a2,
0:u_used,Already Used?,a1,u;Y,N
```


Line 1 is the key field. You can define more than one key, but there is no need to do so here. Hogg used the name of the program described in each record for the key. Since he decided that none of the other information in the record was useful as a key, he described the rest of the fields as data.

It's a *Sculptor* convention to use a prefix like `u_` to name the file in which a variable is found. The word `Title` here is the default text string *Sculptor* will use if you don't override it. The `a20` describes a text field containing 20 characters. Hogg's analysis of the data had shown this was the longest field needed. The `u` means to force uppercase on input. Experienced *Sculptor* users suggest it is wise to force either upper- or lowercase on key fields to prevent confusion during a search.

Line 2 is a field Hogg reserved for future use. The data for this field will need to be added manually, because it does not exist in the original database. However, he knew he needed this information later to determine how many programs will fit on a disk.

Notice the end of Line 2. Hogg used a text field instead of an integer here so he would be able to upload his data files after running them through the OS-9 public domain archiving program *ar*. He had learned earlier that *ar* works only with text files, and he hoped to upload the Users Group Software Library file to many computer bulletin board systems. The `;%0-9999` at the end of the line means that *Sculptor* will allow only numbers from 0 to 9999. This demonstrates how *Sculptor* does input validation.

Line 5 is unique because it converts uppercase letters to lowercase automatically when it reads a data file. This makes the text easier to read. Line 7 holds the one- to three-line description of the function of each UG program. Line 9, the volume number, must be defined as a text field, because an integer field here would default to zero when the field is blank. The field containing the volume number is blank until the program that the record describes has been assigned to a disk in the library.

On describing the data in his new file, Hogg created a program to read the text file he'd prepared with *Umacs* and inserted it into the database. The code in Figure 6 took care of the job.

Here's what happens when you run this program. First, Hogg has told *Sculptor* to reference a filename `disk` with the word `ug`. He then defined some

```
"UGDISKS" FILE CONVERSION TO SCULPTOR FORMAT
!file ug disk

!temp scrline,,12
!temp done,-done-,a32
!scroll 13,3

+u_title,,4,14
+u_from,,6,32
+u_ver,,7,32
+u_language,,8,32
+u_format,,9,32
+u_type,,10,32
+u_volume,,11,32
+u_used,,12,32
+u_function,,13,6
+done,,18,32
start scroll 2 : u_function = ""
scroll : u_function = ""
input u_title-u_format
scroll 1
start1 input u_function
if u_function bw "-done-" then u_function="" : goto start2
if scrline < 3 then scroll : goto start1
input done
start2 input u_type-u_used
insert ug
input u_title
if u_title ct "-END-" then goto start
if u_title ct "-FIN-" then exit
exit
```

Figure 6

```
UG DISK FILE MAINT.                                Today's date [      ]

Title [      ]

# Sectors [      ]
From [      ]
Version [      ]
Language [      ]
Format [      ]
Program Type [      ]

Volume # [      ]
Already Used? [      ]

Function

[ ][
]
[ ][
]
[ ][

i=insert f=find n=next p=prev m=match a=amend d=delete e=exit

Which option do you require?
```

Figure 7

temporary variables and a scroll window. That done, he set up the screen form and told *Sculptor* where to put each field on the screen.

The heart of the program follows the screen form definition. The first two lines clear the last two lines of the function array. Then, data is input into all of the fields. When a line begins with (bw) the string `-done-`, *Sculptor* moves on to the next field. If all three lines are input, a fourth line containing the string `-done-` is ignored. The rest of the fields are then read and inserted into the database.

Since `u_title` forces uppercase, Hogg had to do the `end` and `fin` tests in uppercase. The `ct` means contains.

You can read the program line like this. If `u_title` contains the string `-END-` then go to the beginning and start again.

You use OS-9's redirection operators when you run this program.

```
OS9: sage convUGdisk <convReport
```

A few minutes after typing this line, Hogg had 339 records inserted into a new database — ready for manipulation. He then let *Sculptor* write a program to manipulate the new database, by typing two lines:

```
OS9:sg disk
OS9:sage disk
```

Sculptor came alive with a screen that looked like the one shown in Figure 7.

Figure 8

OS9 USERS GROUP DISKS

```

!file disk disk

.new code
!file dkey diskkey
.new code end

!temp date,,d4
!temp t_u_function,,i1
!temp BS,,i1
!temp scrline,,i2
!temp scrflag,,i1

!scroll 14,3

+date,Today's date,2,70

.new code
+k_keyword,,5,33
.new code end

+u_title,,4,34
+u_size,,6,33
+u_from,,7,33
+u_ver,,8,33
+u_language,,9,33
+u_format,,10,33
+u_type,,11,33
+u_volume,,12,33
+u_used,,13,33
+!t_u_function,,14,2;#
+u_function,,14,5

        display date
END\
        end

*i=insert
        clear : display date
i1\
        message "Use BACKSPACE to finish inserting"
        input u_title bs = i4
        read disk nsr = i2
        scrflag = 0
        gosub DISPLAY
        error "Already recorded"
        end i2\
        gosub GET_DATA
        if BS then goto i1
        insert disk
        clear : display date
        goto i1

.i4\
        clear : display date
.new code
i4        goto ik
.new code end

        end

.new code
*iK=K insert
ik        check disk
ik1        message "Use BACKSPACE to finish inserting"
        input k_keyword bs = END
        k_title = u_title
        insert dkey re = ik2
        goto ik1
ik2        error "That key already exists..."
        end
.new code end

*f=find
        clear : display date
        input u_title bs = END
        find disk
        scrflag = 1
        gosub DISPLAY
        end

.new code
*fK=K find
        clear
        input k_keyword bs = END
        find dkey nsr = fk2
        find disk key = k_title fkl        gosub DISPLAY

```

```

        prompt "Next match" no = END
        match disk nsr =fk2
        goto fkl fk2        message "No matching records"
        end
.new code end

*n=next
        next disk
        scrflag = 1
        gosub DISPLAY
        clear k_keyword
        end

*P=prev
        prev disk
        scrflag = 1
        gosub DISPLAY
        clear k_keyword
        end

*m=match
        match disk nsr = m1
        scrflag = 1
        gosub DISPLAY
        clear k_keyword
        end

m1\
        error "No further matching records"
        end

*a=amend
        check disk
        goto a1

a0\
        input u_title bs = END

a1\
        gosub GET_DATA
        if BS then goto a0
        prompt "All correct" no = al
        write disk
        clear : display date
        message "Record amended"
        end

*d=del
        check disk
        prompt "Are you sure" no = END
        delete disk
        clear : display date
        end

*e=exit
        exit

DISPLAY\
        display u_title-u_used
        scroll 1

D1_u_function\
        t_u_function = scrline
        display t_u_function,u_function
        if scrline = 3 then goto D3_u_function
        scroll
        goto D1_u_function

D3_u_function\
        return

GET_DATA\
        BS = 0
        input u_size-u_used bs = GD1 eoi = GD0

GD0\
        scroll 1

GD_u_function\
        t_u_function = scrline
        display t_u_function,u_function
        input u_function bs = GD1_u_function eoi = GD2_u_function
        scroll
        if scrline <= 3 then goto GD_u_function
        goto GD2_u_function

GD1_u_function\
        if scrline = 1 then goto GET_DATA
        scroll -1
        goto GD_u_function

GD2_u_function\
        return

GD1\
        BS = 1
        return

```


The program *Sculptor* wrote looked like that shown in Figure 8 — almost. Frank added the code between each new code and new code end later to give the program the ability to search on a key field.

Hogg's additions work by letting *Sculptor* know about the file *DiskKey* with the command `!file dkey disk-key`. The program will know it as *Dkey*, and it will store keys in 12-character ASCII fields. The keys are followed by 20-character titles. A match in *DiskKey* returns the title for the main database so that any number of keys may be inserted for any title.

"One person using Sculptor can perform a task that required a systems analyst and a gang of programmers several years ago."

The `+k_keyword,,5,33` adds the keyword field to the screen format at Line 5, Column 33. `ik` inserts a key into the *DiskKey* file after making sure that a record has been selected. Keys are inserted until you type a backspace.

To find a title record, you type a keyword. If a key is found, a search is made in *Disk* using the key `k_title` from the key file. The record is displayed, and the entire process takes less than a second.

That's all it takes to add a sophisticated keyword search to a *Sculptor* program. There are some problems, however. The program above works fine until somebody changes the title in the main file or deletes a record. There are no provisions in the program to change or delete keys when this

```
(* Add to KISSdMenu procedure
(* Now, for the colors!
```

```
RUN gfx2("fill",45,181)
RUN gfx2("fill",116,181)
RUN gfx2("color",2)
RUN gfx2("fill",151,181)
RUN gfx2("color",3)
```

```
(* That's all you need
```

```
(* add this check in the procedure WhichTool
(* following all of the other checks
```

```
IF ButtonEvent.mouse.AcY>180 THEN
ButtonEvent.status.color:=TRUE
END
ELSE
ButtonEvent.status.color:=FALSE
ENDIF
END
```

```
(* add this code to DoEvent
```

```
IF ButtonEvent.status.color THEN
RUN KISScolor(ButtonEvent)
ButtonEvent.status.color:=FALSE
ENDIF
```

```
(* add this code to initialization at start
(* of procedure KISSDraw4
```

```
ButtonEvent.pointer.Coulor:=1
RUN gfx2("color",1)
```

```
(* add the second half of the IF statement
(* to the code in GetKISSMouse
```

```
IF ButtonEvent.mouse.AcX<40 OR ButtonEvent.mouse.AcY>180 THEN
ButtonEvent.status.InToolBox:=TRUE
ELSE
ButtonEvent.status.InToolBox:=FALSE
ENDIF
```

Figure 9: These additions should be made to the existing programs

!!!NEW!!!

OS-9™ SOFTWARE/HARDWARE

L2 UTILITY PAK - Contains a Level II "printer" function that also shows the pathname being searched for when "not found" or permission type errors occur. Also contains level II software ram disk driver. Other included utilities can be used on either level I or II including UNDELting to recover files. **\$39.95**

L1 UTILITY PAK - Contains 40 useful utilities that run under both level I and II OS-9. Included are a complete set of "wild card" file handling utilities, a disassembler, a disk sector editor, and the MacGen command language compiler. MacGen will allow you to generate many useful command macros in minutes, much more useful than procedure files. Macro source is included for a macro to implement an archival backup type function. **\$49.95**

L1+L2 COMBINATION PAK both of above together for **\$75.00**

SDISK - Standard disk driver module replacement allows full use of 40 or 80 track double sided drives with OS-9 Level I. Retains full compatibility with CoCo 35 track format and allows accessing all other OS-9 non-CoCo formats. Easy installation. **\$29.95**

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PC-XFER UTILITIES - Programs to format and transfer files to/from MS-DOS™ diskettes on CoCo under OS-9. (Requires either SDISK or SDISK3 to run depending on which level of OS-9 you are using) **\$45.00**

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All diskettes are in CoCo OS-9 format; other OS-9 formats can be supplied for \$2.00 additional charge. All orders must be prepaid or COD, VISA/MC accepted, add \$1.50 S&H for software, \$5.00 for CCRD, additional charge for COD.

D. P. Johnson, 7655 S.W. Cedarcrest St., Portland, OR 97223
(503) 244-8152 (For best service call between 9-11 AM Pacific Time)

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happens. Hogg fixed that problem by rewriting the amend code:

```
*a=amend
    check disk
    goto a1 a0\
    title = u_title
    input u_title bs = END
    if u_title <> title then flag=2
a1\
    gosub GET_DATA
    if BS then goto a0
    prompt "All correct" no = a1
    write disk
    if flag = 2 then gosub CHANGE_KEYS
    clear : display date
    message "Record amended"
    end

CHANGE_KEYS\
    rewind dkey
    next dkey nsr = ch_return
    if k_title <> title then goto chl
    k_title = title
    write dkey
    goto chl
ch_return\
    flag = 0
    return

CHANGE_KEYS\
    k_keyword = ""
    k_title=title
    chl
    readkey dkey nsr=ch_return
    read dkey
    delete dkey
    goto chl
```

Hogg then wrote the following code to delete all keys referring to a main record after that record has been deleted. It is almost the same as the amend code, but this time he wrote it in-line rather than as a subroutine:

```
*d=del
    check disk
    prompt "Are you sure" no = END
    title = u_title
    delete disk
    rewind dkey
    next dkey nsr = d12
    if title <> k_title then goto d11
    delete dkey
    goto d11 d12    clear : display date
    end
```

If Hogg had been working with a larger database — or had thought about it sooner — he would have written the Users Group Software Library database program differently. The sequential method used here would be too slow to manipulate huge databases. However, this month we have only set out to show you how one person using *Sculptor* can perform a task that required a systems analyst and a gang of programmers several years ago.

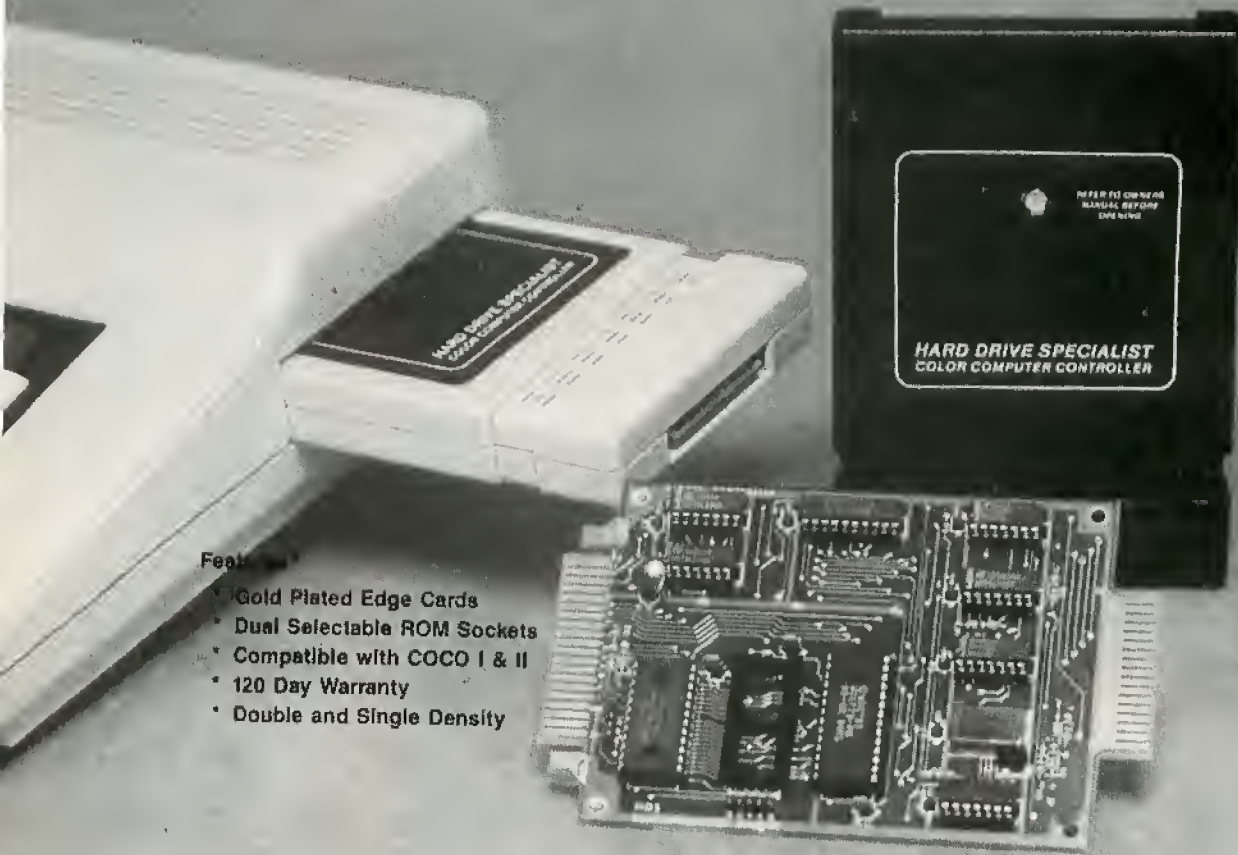
Planning how the data in your various databases interacts is probably the most important step when you start to program with a database language like *Sculptor* — even when you're writing a small program. We'll look at this and a few other database programming considerations next month when we continue to explore the OS-9 Users Group Software Library with this fourth-generation language. Until then, Happy Groundhog's Day! □

The listing: KISSColor

```
PROCEDURE KISSColor
0000    (* Program to select and change colors
0026    TYPE rodent=Vid,Act,ToTm:BYTE; X1:INTEGER; TTTo:BYTE; TSSSt:
        INTEGER; CBSA,CBSB,CCtA,CCtB,TTSA,TTSB,TLA,TLB:BYTE
        ; X2,BDX,BDY:INTEGER; Stat,Res:BYTE; AcX,AcY,WRX,WRY:
        INTEGER
0097    TYPE stats=event,InWindow,InToolBox,InMenuBar,line,box,circle
        ,ellipse,bar,arc,fill,text,freehand,patterns,horzlines
        ,vertlines,slantright,slantleft,dots,color:BOOLEAN
00EE    TYPE cursor=NoCur,arrow,pencil,cross,hourglass,NoIcon,TextBar
        ,Scross,Icon,IconBuff,Coulor:BYTE
0121    TYPE packet=mouse:rodent; status:stats; pointer:cursor
013E    TYPE registers=cc,a,b,dp:BYTE; x,y,u:INTEGER
0163    DIM RegisterSet:registers
016C    DIM callcode:BYTE
0173    PARAM ButtonEvent:packet
017C    DIM Currcolor,Covalue:INTEGER
0187    RegisterSet.a:=0
0192    RegisterSet.b:=$89
019E    RegisterSet.x:=ADDR(ButtonEvent.mouse)
01AF    RegisterSet.y:=1
01BA    callcode:=$8D
01C2    Currcolor:=ButtonEvent.pointer.Coulor
01D0    IF ButtonEvent.mouse.AcX<76 THEN
01E2        REPEAT
01E4            RUN syscall(callcode,RegisterSet)
01F3            Covalue:=INT(ButtonEvent.mouse.AcX/10)
0206            RUN gfx2("palette",Currcolor,Covalue)
021F        UNTIL ButtonEvent.mouse.CBSA=0
0230        END
0232    ENDIF
0234
0235    IF ButtonEvent.mouse.AcX<115 THEN
0247        ButtonEvent.pointer.Coulor:=0
0255        RUN gfx2("color",0)
0265        RUN gfx2("bar",0,180,76,191)
027C        END
027E    ENDIF
0280    IF ButtonEvent.mouse.AcX<150 THEN
0292        ButtonEvent.pointer.Coulor:=1
02A0        RUN gfx2("color",1)
02B0        RUN gfx2("bar",0,180,76,191)
02C7        END
02C9    ENDIF
02CB    IF ButtonEvent.mouse.AcX<185 THEN
02DD        ButtonEvent.pointer.Coulor:=2
02EB        RUN gfx2("color",2)
02FB        RUN gfx2("bar",0,180,76,191)
0312        END
0314    ENDIF
0316    IF ButtonEvent.mouse.AcX<220 THEN
0328        ButtonEvent.pointer.Coulor:=3
0336        RUN gfx2("color",3)
0346        RUN gfx2("bar",0,180,76,191)
035D        END
035F    ENDIF
0361    END
```


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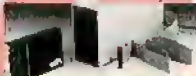
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PYRAMIX features the finest in animation, graphics, sound effects and game play available today. It has all the extras you want, too, such as a pause option, RGB and CHP modes, keyboard or joystick play, help screen, multiple skill level, and the ability to backup your disk.

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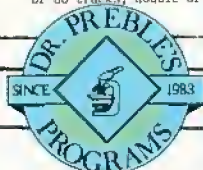
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LIGHTNING RAM DISK is the most versatile RAM disk for your 512K Color Computer 3! **LIGHTNING RAM DISK** will allow you to use up to 4 mechanical drives and 2 RAM drives simultaneously for a total of 6 Drives! This RAM DISK will also work simultaneously with our amazing **LIGHTNING PRINTER SPOOLER**! \$19.95 on disk + s/h.

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Dr. Preble's Prescriptions

BASIC FREEDOM! No one wants to be chained down. And yet, if you type in BASIC programs, you have been subject to involuntary servitude! The culprit? BASIC's limited EDIT command.

Demand Your BASIC FREEDOM! Programmed by Chris Ballcock for ColorVenture, this software gives you a full screen editor for typing in and editing BASIC programs! Move the cursor anywhere on the screen. Insert, delete or add text. It's the same concept as in a word processor, except you never have to leave BASIC! **BASIC FREEDOM** is an invisible machine language program which you can turn on and off at will. Even pressing RESET will not hurt your BASIC FREEDOM! Simple, yet powerful with an easy to read manual. Many extra "nice touches" included, like KEY REPEAT and LOWERCASE INTERPRETER which lets you type BASIC commands in upper or lower case for ease of programming. Translation to uppercase is automatic for commands. Text in quotes is not affected.

For CoCo 1, 2 or 3!

SPECIAL, COCO 3 VERSION lets you work in 32, 40, or 80 column display modes. A separate version is available for the CoCo 1 and 2. Available on disk for \$24.95 + s/h.

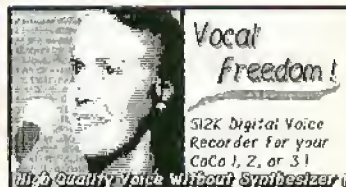
MENTAL FREEDOM by Dr. Preble! **IMAGINE!** Some day, a computer so advanced that it responds to your very thoughts and emotions. Imagine, some day, thought-controlled graphics: levitation and materialization! **PLUG IN YOUR MIND AND UNHOOK YOUR JOYSTICKS**—that day is now! The Radio Shack Color Computer has many advanced capabilities, just waiting to be tapped. Dr. Preble's Programs combines the advanced technology of the CoCo with the amazing Radio Shack Biofeedback Monitor to bring you "Mental Freedom."

For CoCo 2 or 3

THOUGHT-CONTROLLED VIDEO CHALLENGE? Unlike any video game you have ever played, our Thoughtware tests your ability to handle stress, to remain calm under adverse circumstances. **LIGHTNING FAST** reflexes will do you no good here, unless you first tame the fickle dragon of your mind. Are you the secretly nervous type? Many people can keep a "Poker Face" even when they are worried so that others say not notice; but can you really stop the worry itself? Find out with **Mental Freedom!**

AND IT TALKS! Did you know that the CoCo can produce incredibly realistic digital speech without a special speech synthesizer? The voice quality is so good, it sounds human! Honest. Best of all, no extra hardware is needed for speech, just some clever programming by Dr. Preble.

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for CoCo 1, 2 or 3

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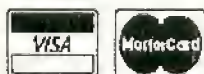
Emboss Grade 1 or Grade 2 Braille using your CoCo 1, 2 or 3 and a Brother Daisy Wheel printer! Fast. Print to Braille conversion algorithm converts word processor files, program listings and data files into touch readable Braille. For use by the blind or the sighted. No knowledge of the Braille code is necessary. Just send print to the program and out comes Braille! Note: The complex Grade 2 conversion is very good and though not always perfect, quite readable. Requires 64K or more. Brother HR series printer or the IF-50 interface series required. Low Cost! Similar software costs 3 times as much. Only \$29.95 + s/h

VDOCS, the UnDISK: Save multiple programs in memory. Or save multiple graphic pictures in memory. Works with or without a disk. Let's you SAVE, LOAD and KILL stored programs or graphics. **DIRECTORY** function lists files, gives the start, end and execution addresses of machine language programs and number of free bytes remaining. On a RAM disk without buying a disk drive! Requires 64K CoCo 1 or 2. Available on tape or disk for \$24.95 + shipping/handling.

VDRMP, for the UnDISK: Backup all your UnDISK files to a single tape file for easy reloading. A must for VDOCS users! On tape for \$14.95 + shipping/handling.

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